



Environmental Investigation & Remediation

SITE HEALTH AND SAFETY PLAN

KOKOMO DUMP SITE

1130 South Dixon Road

Kokomo, Indiana 46901

Site Spill Identification Number: C564

Administrative Settlement Agreement and Order on Consent for

Removal Action Docket Number V-W-13•C-018

Prepared For:

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SITE HEALTH AND SAFETY PLAN


Kokomo Dump Site – Kokomo, IN

I hereby certify that the enclosed Site Health and Safety Plan, shown and marked in this submittal, has been prepared in accordance with OSHA 29 CFR 1910 and is proposed to be incorporated with Administrative Settlement Agreement and Order on Consent for Removal Action Docket No. V-W-13•C-018. This Site Health and Safety Plan is submitted for Government review and acceptance.

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GLOSSARY OF ACRONYMS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
COC	contaminant of concern
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
dBA	decibel A-weighted
DEET	N, N-diethyl-m-toluamide
EMR	experience modification rate
EMT	emergency medical technician
ERRS	Emergency and Rapid Response Services
USEPA	United States Environmental Protection Agency
EZ	Exclusion Zone
HASP	Site Health and Safety Plan
HAZWOPER	Hazardous Waste Operation and Emergency Response
HIPO	high loss potential
HMIS	Hazardous Materials Identification System
HTRW	hazardous, toxic and radioactive waste
IDLH	immediately dangerous to life and health
kV	Kilovolt
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
mg/m³	milligrams per cubic meter
MSDS	Material Safety Data Sheet
NFPA	National Fire Prevention Association
NIOSH	National Institute of Occupational, Safety and Health
NPL	National Priority List
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PM	Project Manager
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
ppm	parts per million
RIR	recordable incident rate
SCBA	self-contained breathing apparatus
SOP	Standard Operating Procedure
SOW	Scope of Work
SHSO	Site Health and Safety Officer
WNV	West Nile Virus

SESCO Group

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed for the Kokomo Dump Site, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received or conditions change. A written amendment will document all changes made to the plan. Any amendments to this plan will be included in Attachment A. Where appropriate, specific OSHA standards or other guidance will be cited and applied.

All work practices and procedures implemented on site must be designated to minimize worker contact with hazardous materials and to reduce the possibility of physical injury. All work will be performed in accordance with applicable Federal 29 CFR 1910 and 1926 health and safety regulations, including the Federal 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response regulation.

1.1 *Daily Safety Meetings*

Daily safety meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly and to address worker health and safety concerns.

1.2 *Site Specific Training and Acknowledgement*

The Response Manager shall be responsible for informing all individuals assigned to this project of the contents of this plan and ensuring that each person signs the Site Specific Training Record in Attachment E. By signing the Site Specific Training Record, individuals acknowledge receipt of this training and that they recognize the potential hazards present on-site and the policies and procedures required minimizing exposure or adverse effects of these hazards.

1.3 *Key Personnel*

Project/Task Order: Site	
Key Personnel	
Names and Titles	Contact Information
Shelly Lam – USEPA Region 5, OSC	Office – 317-308-3073; cell – 317-417-0980
Heidi Meyer - Response Manager	Office – 317-347-9590 ext 22; cell 317-696-3734
Nick Michailides - SHSO	Office – 708-333-9915; cell – 219-286-5359
Brad Adams - Project Coordinator/Manager	Office – 317-347-9590 ext 31; cell – 317-847-9973
Subcontractors	
Company	Scope of Services
Environmental Restoration LLC (ER)	Health and Safety; removal/restoration actions
Midway Services	Drilling
American Industrial Services (AIS)	Waste Disposal

Accutek Radar Imaging	Utility Locating
Miller Surveying	Professional Surveyors
Morgan Clark Associates	Phase I Environmental Site Assessment
Prism GeoImaging	Geophysical Survey

2.0 ROLES AND RESPONSIBILITIES

2.1 *Response Manager (RM): Heidi Meyer*

The Response Manager, as the field representative for SESCO and its subcontractors, has the responsibility for implementing the Site Health and Safety Plan (HASP). The RM shall manage the project and ensure all health and safety requirements are met. The RM will work in conjunction with the Site Health and Safety Officer for this project.

2.2 *Site Health and Safety Officer (SHSO): Nick Michailides*

The Site Health and Safety Officer (ER representative) is assigned to the site on a full-time basis with functional responsibility for implementing the HASP.

Specific Duties Include:

- a. Assist RM in providing a safe and healthful work environment.
- b. Supervise confined space entries.
- c. Assist RM in reporting and investigating all incidents.
- d. Ensure proper decontamination of personnel and equipment is accomplished.
- e. Ensure that air monitoring equipment is calibrated and operational.
- f. Conduct personal air monitoring as required.
- g. Perform respirator fit tests, as necessary.
- h. Inventory and inspect personal protective equipment (PPE) prior to personnel entries into exclusion zone.
- i. Prepare summary letter of personal air sampling results.
- j. Ensure proper personal protective equipment is being utilized.
- k. Assist RM in obtaining required personnel training and medical records.
- l. Inspect first aid kits and fire extinguishers.

2.3 *Other:*

Any persons who observe a health and safety hazard should immediately report observations/concerns to appropriate key personnel listed in Section 2.1 or 2.2 above.

2.4 *U.S. EPA On-Scene Coordinator (OSC): Shelly Lam*

The OSC has overall project authority and directs the project manager regarding the tasks required to meet project objectives. The OSC has the authority to stop work and initiate corrective actions should there be a reason to do so.

3.0 SITE BACKGROUND AND SCOPE OF WORK

3.1 Site Background

Kokomo Dump Site was owned and operated by the City of Kokomo as a former municipal waste open dump in the 1960s, but had been shut down in January 1970, when a landfill opened nearby. It was reported that an estimated 30,000 cubic yards of accumulated garbage were present in early 1970 when the dump ceased operations. The newspaper articles indicated that the dump site was seven (7) acres in size. It is presumed that a portion of the property to the south of the Site was part of the dump site. Further investigation and removal activities may be necessary on the adjacent southern property based on results of investigation activities. The Site has been utilized as a yard waste composting facility since around 1980 and is open seasonally from April through November. Residents of the Kokomo area can bring compostable yard waste to the facility for disposal and the waste is processed through chippers and is turned into mulch and re-usable landscaping products. The Indiana Department of Environmental Management (IDEM) discovered drums exposed in what was described as a creek bed / bank at the Site in April of 2011. IDEM collected samples of the leaking drum contents resulting in high concentrations of metals. IDEM requested the assistance of the US EPA. A US EPA OSC, in conjunction with a US EPA START contractor, conducted a Site assessment on August 19, 2011. High concentrations of arsenic and lead were confirmed in both surface and subsurface samples of soils. In addition PCBs were detected above US EPA regulatory limits in subsurface soils.

The US EPA subsequently issued a General Notice of Public Liability to the City of Kokomo on April 5 2012.

3.2 Scope of Work (SOW)

SESCO has been tasked by the EPA to perform the following:

- Develop and implement Site plans including a Site-specific Health and Safety Plan (HASP), a Quality Assurance Project Plan (QAPP), a Site Emergency Contingency Plan, and a Work Plan;
- Establish Site security;
- Determine the extent of buried drums and contamination in soil;
- Develop and implement a plan to control, contain, and/or remove drums and highly contaminated soil;
- Perform sampling and analysis to determine disposal options; and,
- Consolidate and package hazardous substances, pollutants, and contaminants for transportation and off-Site disposal in accordance with the U.S. EPA Off-Site Rule, 40 Code of Federal Regulations (CFR) §300.440.

The above tasks will be completed in a phased approach. Due to the nature of the Site, the extent of contamination will be determined in a series of steps and not during one (1) mobilization to the Site. It is expected that Site work and the Summary Report will be completed in a span of five (5) to six (6) months following Work Plan approval. The tasks listed below will be completed during this phase of the project:

- Develop and implement Site plans including a Site-specific HASP, a QAPP, a Site Emergency Contingency Plan, and a Work Plan;
- Site boundary survey;
- Phase I Environmental Site Assessment (ESA);
- Removal of brush and yard waste from Site;
- Geophysical survey;
- Surface and sub-surface soil sampling (soil borings);
- Test pits based on results of geophysical survey; and,
- Development of a Summary Report detailing the work performed.

Below is a list of action items that will be completed to fulfill the above tasks. These action items represent the greatest potential for health and safety related risks and thus are the focus of this HASP:

- Prepare a secure staging area for drums and excavated potentially contaminated soils/materials
- Remove and overpack drums and stage on pallets with appropriate access paths.
- Properly characterize the contents of the drums
- Bulk/segregate similar waste streams
- Excavate contaminated soils and treat on site or load out contaminated soils for disposal.
- Backfill excavations
- Transport and dispose of all hazardous materials at an EPA approved disposal facility, in accordance with U.S. EPA's Off-Site Rule
- Follow Applicable or Relevant and Appropriate Requirements (ARARs) issued for this site by IDEM.

4.0 HAZARD ASSESSMENT

This section is to be addressed in the daily tool box safety meeting as each task is to be initiated. Each Activity Hazard Analysis (AHA) is designed to develop awareness of chemical and physical hazards specific to each task. It would be impractical to repeat in complete detail each control measure and Standard Operating Procedure (SOP) for each job task. Sources, hazards and control measures will be addressed for each job task.

Specific work tasks with unique hazards and/or PPE requirements must be evaluated or reevaluated prior to beginning work. This task review will be led by the Project Health and Safety Manager and the SHSO, and will include knowledgeable individuals such as the worker(s) and the supervisor. PPE requirements, based on this assessment, will be included in Section 6 of the HASP or in the AHA for the specific task. All workers must be trained in the requirements of the HASP and the applicable AHAs prior to beginning work. The required PPE may be changed by the SHSO, based on the results of additional air monitoring, or on task-specific needs. Downgrades will require the approval of the Project Health and Safety Manager unless otherwise permissible by the HASP.

The following section outlines the AHAs, Referenced SOPs and Chemical Hazards associated with this project. Applicable SOPs are available from SESCO or ER's Health and Safety Database.

The AHAs should be revised for site-specific activities and reviewed with the work crew before commencing any activity.

The following table lists SESCO and ER health and safety SOPs that are applicable to this project.

Referenced SOPs:	
SESCO SOPs applicable to this project:	
HASP-01 Public Utility Locating HASP-02 Private Utility Locating HASP-03 Tailgate Safety Meeting	
ER SOPs applicable to this project or task order:	
HS-01 Air Monitoring and Sampling HS-02 Blood Borne Pathogens Exposure Control Plan HS-04 Flammable Liquids Transfer (Bonding and Grounding) HS-05 Cold Stress HS-08 Decontamination Measures HS-10 Motor Vehicle Operations HS-11 Drum Handling HS-12 Electrical Safety - General HS-15 Hazard Communication HS-16 Hearing Conservation HS-17 Heat Stress Safety HS-13 Excavation and Trenching	HS-18 Heavy Equipment Operation HS-24 Personal Protective Equipment HS-26 Respiratory Protection Program HS-28 Pressure Washing HS-35 Hazard Categorization and Inventory HS-36 Proper Lifting Techniques HS-38 Fire Prevention Protection HS-49 Tool Safety and Inspection HS-50 First Aid HS-51 Incident Reporting and Investigation HS-52 General Waste Management HS-53 Spill Prevention Response
UXO known or suspected to present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	UXO support and plans provided Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Lifts Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Items to be lifted: Drums (via all terrain forklift or applicable heavy equipment)	Critical <input type="checkbox"/> Ordinary <input type="checkbox"/>
Excavations Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

4.1 Chemical Hazards

Site Contaminants/Chemicals of Concern					
Chemical	Media	PEL	ACTION LEVEL	Route of Entry	Symptoms Acute/Chronic
PCB (54% Chlorine)	Liquid or solid (soil)	0.5 mg/m3 {skin}	0.25 mg/m3	Inhalation Ingestion Contact Absorption	Irritation eyes, liver damage, reproductive effects, chloracne
VOC (Benzene)	Vapor or liquid (soil)	1 ppm PEL 5 ppm STEL	0.5 ppm	Inhalation Ingestion Absorption	Irritation eyes, skin, resp system; dizziness; HA; staggered gait. CHRONIC (leukemia)
Lead	Solid/Dust	0.05 ^{mg} / _{m3}	0.025 mg/m3	Inhalation Ingestion Contact	Lassitude, insomnia; facial pallor; anorexia, low-wgt, malnutrition; constipation , abdominal pain, colic; anemia; tremor; kidney disease
Mercury	Liquid/Vapor	C 0.1 mg/m3 {skin}	0.05 mg/m3	Inhalation Absorption Ingestion Contact	Irrit eyes, skin; cough, chest pain, dysp, bron, pneu; tremor, insom, indecision, head, lass, GI dist
Barium Compounds (except Barium	Solid / Dust	0.5 mg/m3	0.25 mg/m3	Inhalation Ingestion	Irrit eyes, skin, upper resp; gastroenteritis; musc spasm; hypokalemia

Sulfate)					
Barium Sulfate (found in paint pigments)	Solid / Dust	15 mg/m3 TOTAL 5 mg/m3 RESP	7.5 mg/m3 TOTAL 2.5 mg/m3 RESP	Inhalation Ingestion Contact	Irrit eyes, nose, upper resp; baritosis
Cadmium dust	Solid	.005 mg/m3	.0025 mg/m3 Resp	Inhalation Ingestion	Pulm edema, dysp, cough, chest tight, head; chills, musc aches; nau, vomit, diarr
Chromium(III)	Liquid or solid (drum)	0.5 mg/m3	0.25 mg/m3	Inhalation Ingestion Contact	Irrit eyes, sens derm
Silver	Solid / Dust	0.01 mg/m3	0.005 mg/m3	Inhalation Ingestion Contact	Blue-grey eyes, nasal septum, throat, skin; irrit, ulceration skin
Selenium	Solid / Dust	0.2 mg/m3	0.1 mg/m3	Inhalation Ingestion Contact	Irrit eyes, skin, nose, throat; chills, fever; metallic taste / garlic breath; GI dist; derm; eye, skin burns.
Arsenic (inorganic)	Solid/Dust	0.010 mg/m3	.005 mg/m3	Inhalation Absorption Ingestion Contact	Ulceration of nasal septum, Derm, GI disturbances, resp irrit, carc

The above listing should not be taken as a complete assessment of the hazards posed by materials at the Kokomo Dump Site. The known and unknown mixed chemical hazards at this site prevent a clear determination of the specific effects of discrete compounds. Therefore, personnel must be alert for symptoms of possible exposure such as unusual smells, stinging, burning eyes, nose and throat, skin irritation, as well as feeling extremely well, depressed, sleepy or tired. Symptoms must be immediately reported to the site supervisor. For additional information on potential COCs see the NIOSH Pocket Guide to Chemical Hazards September 2005 edition or www.cdc.gov/niosh.

4.2 Task Specific Hazards and Controls

This section is to be addressed in the daily tool box safety meeting as each task is to be attempted. Each AHA is designed to develop awareness to chemical and physical hazards specific to each task. It would be impractical to repeat in complete detail each control measure and SOP for each job task. Sources, Hazards and Control Measures will be addressed for each job task.

Activity Hazard Analysis		
JOB TASK: MOBILIZATION and SITE SETUP		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL D / MOD D		
Hazard	Sources	Control Measures
Corrosive/toxic liquids/sludge/solids	Open drums, containers, dirt	<ul style="list-style-type: none"> - Do not move or handle open containers - Do not move or excavate any soil or brush piles
Traffic related injury	Driving motor vehicles	<ul style="list-style-type: none"> - Follow HS-10 Motor Vehicle Operation - Adjust controls/mirrors prior to operation - Utilized defensive driving techniques.
Struck by/caught between	Vehicle & Equipment Operation	<ul style="list-style-type: none"> - Follow HS-18 Heavy Equipment Operation - Ensure outriggers are properly positioned for wheeled excavator/equipment - Only qualified drivers permitted to operate vehicles - Wear ANSI Type 2 high-visibility safety vest - Wear seat belts while in operation - Back up alarms functional and loud enough to hear over surroundings - Ground personnel are not allowed within swing radius of equipment while in operation - Personnel must establish eye contact with operator and operator must disengage and remove hands from controls prior to entering the swing radius
Ergonomics	Lifting and bending	<ul style="list-style-type: none"> - Follow HS-36 Proper lifting techniques - Use Buddy system - No individual lifting over 40 lbs. - Use mechanical means when feasible
Heat Stress / Cold Stress	Work in protective garments	<ul style="list-style-type: none"> - Cool / Warm break areas - Follow ER SOP HS-17 - Plenty of Fluids & breaks
Noise	Heavy equipment/Hand tools	<ul style="list-style-type: none"> - Hearing protection required at all times when working with tools generating sound above 85db - Hearing protection required when operation open-cab equipment - If you have to shout to be heard, use hearing protection
Fire	Electrical devices/service	<ul style="list-style-type: none"> - Fire extinguishers with at least a 3A:40B:C rating shall be placed in when working
Electrocution	Power tools/equipment	<ul style="list-style-type: none"> - Inspect all power cords prior to use - Use GFCI on all connections - De-energize all circuits in building except for overhead lights and limited 110v receptacles. - Protect/elevate temporary power cords
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear cut resistant gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Poor condition of building Insufficient lighting Uneven terrain/debris	<ul style="list-style-type: none"> - Keep area organized - Identify/mark hazards - Remove debris from walking/ working surfaces

Activity Hazard Analysis		
JOB TASK: EXCAVATION AND SAMPLING / MIXING (IF NEEDED) OF CONTAMINATED SOILS / BRUSH		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL C		
Hazard	Sources	Control Measures
Toxic Chemicals	Soil / Dusts	Maintain dust suppression with water spray/mist as needed. Control work area to authorized personnel only Utilize PPE per Section 6 of this HASP Minimize contact with contaminated soils
Cuts/Punctures	Sharp Objects	Beware of sharp objects Wear leather gloves
Ergonomics	Lifting and Bending	Proper lifting techniques Buddy system
Cold Stress	Winter Temperatures	Follow H&S Procedures (ACGIH Guidelines) Plenty of Fluids & breaks in warm areas
Noise	Equipment/vehicles Hand tools	Hearing protection for levels > 85 dBs;
Slips/Trips/Falls	Uneven Terrain Debris	Identify/mark hazards Remove debris from walking / working surfaces Maintain soil stockpiles a safe distance from edge of excavation
Electrocution/explosion/fire	Overhead/underground utilities	Locate and mark existing energized lines – Local locate company Disconnect/de-energize electrical lines if possible Use spotter at all time during operations near overhead lines Boot lines or use hot stick to move line out of reach of equipment
Struck by/caught between	Vehicle & Equipment Operation/Traffic	Only qualified drivers permitted to operate vehicles Wear ANSI Type 2 high-visibility safety vest Wear seat belts while in operation Stay away from operating equipment, Avoid walking between equipment and stationary objects,

Activity Hazard Analysis		
JOB TASK: LOADING OF CONTAMINATED SOILS		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL C		
Hazard	Sources	Control Measures
Toxic Chemicals	Soil	Maintain dust suppression with water spray/mist as needed. Control work area to authorized personnel only Utilize PPE per Section 6 of this HASP Minimize contact with contaminated soils
Cuts/Punctures	Sharp Objects	Beware of sharp objects Wear leather gloves
Ergonomics	Lifting and Bending	Proper lifting techniques Buddy system
Cold Stress	Winter Temperatures	Follow H&S Procedures (ACGIH Guidelines) Plenty of Fluids & breaks in warm areas
Noise	Equipment/vehicles Hand tools	Hearing protection for levels > 85 dBs;
Slips/Trips/Falls	Uneven Terrain Debris	Identify/mark hazards Remove debris from walking / working surfaces
Struck by/caught between	Vehicle & Equipment Operation/Traffic	Only qualified drivers permitted to operate vehicles Use spotters when backing or moving dump trucks onsite Wear ANSI Type 2 high-visibility safety vest Wear seat belts while in operation Stay away from operating equipment, Avoid walking between equipment and stationary objects,

Activity Hazard Analysis		
JOB TASK: BACKFILLING OF EXCAVATIONS		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL D		
Hazard	Sources	Control Measures
Cuts/Punctures	Sharp Objects	Beware of sharp objects Wear leather gloves
Ergonomics	Lifting and Bending	Proper lifting techniques Buddy system
Cold Stress	Winter Temperatures	Follow H&S Procedures (ACGIH Guidelines) Plenty of Fluids & breaks in warm areas
Noise	Equipment/vehicles Hand tools	Hearing protection for levels > 85 dBs;
Slips/Trips/Falls	Uneven Terrain Debris	Identify/mark hazards Remove debris from walking / working surfaces
Struck by/caught between	Vehicle & Equipment Operation/Traffic	Only qualified drivers permitted to operate vehicles Use spotters when backing or moving dump trucks onsite Wear ANSI Type 2 high-visibility safety vest Wear seat belts while in operation Stay away from operating equipment, Avoid walking between equipment and stationary objects,

Activity Hazard Analysis		
JOB TASK: SURFACE AND SUBSURFACE SAMPLING OF CONTAMINATED SOILS		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL D / MOD D/UPGRADE TO LEVEL C OR B BASED ON AIR MONITORING RESULTS		
Hazard	Sources	Control Measures
Toxic Chemicals	Soil	Control work area to authorized personnel only Utilize PPE per Section 6 of this HASP Minimize contact with contaminated soils
Cuts/Punctures	Sharp Objects	Beware of sharp objects Wear leather gloves
Ergonomics	Lifting and Bending	Proper lifting techniques Buddy system
Cold Stress	Winter Temperatures	Follow H&S Procedures (ACGIH Guidelines) Plenty of Fluids & breaks in warm areas
Noise	Equipment/vehicles Hand tools	Hearing protection for levels > 85 dBs;
Slips/Trips/Falls	Uneven Terrain Debris	Identify/mark hazards Remove debris from walking / working surfaces Maintain soil stockpiles a safe distance from edge of excavation
Electrocution/explosion/fire	Overhead/underground utilities	Locate and mark existing energized lines – Local locate company Disconnect/de-energize electrical lines if possible Use spotter at all time during operations near overhead lines Boot lines or use hot stick to move line out of reach of equipment
Struck by/caught between	Vehicle & Equipment Operation/Traffic	Only qualified drivers permitted to operate vehicles Wear ANSI Type 2 high-visibility safety vest Wear seat belts while in operation Stay away from operating equipment, Avoid walking between equipment and stationary objects,

Activity Hazard Analysis		
JOB TASK: CONDUCT WORK ZONE / PEM AIR MONITORING		
PERSONAL PROTECTIVE EQUIPMENT: Consistent with Task		
HAZARD	SOURCES	CONTROL MEASURES
Corrosive/toxic liquids/sludge	Dust, loose solids, liquids	Poly –coated Tyvek or equiv., nitrile gloves, supplied air respirator, use wetting dust suppression agents as necessary. Level B not anticipated.
Noise	Equipment	Hearing protection at levels > 85 dBs.
Struck by / Pinch Points	Bobcat, Forklift, Vehicles	Stay away from operating equipment, avoid walking between equipment and stationary objects, use hand signals
Slips / Trips / Falls	Uneven terrain / Debris	Keep work area organized
Heat Stress / Cold Stress	Winter Temperatures PPE Usage	Follow HS-17 Follow H&S Procedures (ACGIH Guidelines)

Activity Hazard Analysis		
Job TASK: CHEMICAL CONTAINER SAMPLING / HANDLING / BULKING		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL B (Sampling Unknown)/LEVEL C(Handling/Bulking Known)		
Hazard	Sources	Control Measures
Chemical Exposure	Chemicals in drums, totes, buckets, and small containers Chemicals in vats, tanks	<ul style="list-style-type: none"> - Avoid contact - Prior to retrieval secure containers to prevent leakage or splash hazard - Use appropriate sampling techniques with drum thieves - Use proper field categorization techniques - Use proper bulking techniques based on sound field categorization results - Bulk only like materials based on field categorization - Splash prevention measures/ face shields- visqueen shield around drums - If possible have thermometer near for temperature changes - After drum is full leave container open for a period of time - Implement proper handling in accordance with HS-11 Drum Handling - Control work area to authorized personnel only - Utilize proper PPE per section 6.0 of this HASP - Perform air monitoring per section 8.0 of this HASP - Implement proper decontamination procedures per section 10.0 - Construct proper containment around storage area
Fire	Site chemical (Oxidizers, flammable liquids/solids) Electrical devices/service	<ul style="list-style-type: none"> - Minimize handling of containers - Properly segregate chemicals to prevent reaction - Store out of direct sunlight - Perform air monitoring per section 6.0 of this HASP - Fire extinguishers with at least a 3A:40B:C rating in when working
Ergonomics	Lifting and bending	<ul style="list-style-type: none"> - Buddy system/Proper lifting techniques - No individual lifting over 40 lbs.
Struck by/caught between	Vehicle & Equipment Operation/Traffic	<ul style="list-style-type: none"> - Follow HS-10 Motor Vehicle Operation - Follow HS-18 Heavy Equipment Operation - Ensure outriggers are properly positioned for wheeled excavator/equipment - Only qualified drivers permitted to operate vehicles - Wear ANSI Type 2 high-visibility safety vest - Wear seat belts while in operation - Back up alarms functional and loud enough to hear over surroundings - Ground personnel are not allowed within swing radius of equipment while in operation - Personnel must establish eye contact with operator and operator must disengage and remove hands from controls prior to entering the swing radius
Heat/Cold Stress	Seasonal Temperatures/ Work in protective garments	<ul style="list-style-type: none"> - Cool/Warm break areas - Follow ER SOP HS-17 - Follow ER SOP HS-5

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Activity Hazard Analysis		
Job TASK: CHEMICAL CONTAINER SAMPLING / HANDLING / BULKING		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL B (Sampling Unknown)/LEVEL C (Handling/Bulking Known)		
Hazard	Sources	Control Measures
		<ul style="list-style-type: none"> - Plenty of Fluids & breaks - Follow H&S Procedures (ACGIH Guidelines)
Noise	Heavy Equipment, Diaphragm Pumps, Air compressor, Hand Tools	<ul style="list-style-type: none"> - Hearing protection required at all times when working near pumps, air compressors, hand tools and heavy equipment above 85db
Electrocution	Power tools/equipment	<ul style="list-style-type: none"> - Inspect all power cords prior to use - Use GFCI on all connections
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear cut resistant gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Structure/roof trusses Uneven terrain/debris	<ul style="list-style-type: none"> - Keep area organized - Identify/mark hazards - Remove debris from walking/ working surfaces

Activity Hazard Analysis		
JOB TASK: DECONTAMINATION OPERATIONS		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL C / MOD D BASED ON AIR MONITORING RESULTS		
Hazard	Sources	Control Measures
Chemical Exposure	Chemicals in drums, totes, buckets, or small containers	<ul style="list-style-type: none"> - Avoid contact - Prior to retrieval secure containers to prevent leakage or splash hazard - Use appropriate sampling techniques with drum thieves - Use proper field categorization techniques - Use proper bulking techniques based on sound field categorization results - Bulk only like materials based on field categorization - Splash prevention measures/ face shields- visqueen shield around drums - If possible have thermometer near for temperature changes - After drum is full leave container open for a period of time - Implement proper handling in accordance with HS-11 Drum Handling - Control work area to authorized personnel only - Utilize proper PPE per section 6.0 of this HASP - Perform air monitoring per section 8.0 of this HASP - Implement proper decontamination procedures per section 10.0 - Construct proper containment around storage area
Burns/lacerations	Hot water pressure washer	<ul style="list-style-type: none"> - Operate pressure washer per manufactures instructions - Pressure washer must be equipped with safety shut-off - Inspect hose prior to each use - Do not point wand at other individuals - Wand must be at least 48" in length - Wear splash shield and safety glasses when not wearing respirator - Never use for personnel decontamination
Confined Space	Excavations / trenches	<ul style="list-style-type: none"> - Avoid entry if possible - Follow HS-06 Confined Space Entry
Fire	Site chemical (Oxidizers, flammable liquids/solids) Electrical devices/service	<ul style="list-style-type: none"> - Minimize handling of containers - Properly segregate chemicals to prevent reaction - Store out of direct sunlight - Perform air monitoring per section 6.0 of this HASP - Fire extinguishers with at least a 3A:40B:C rating in when working
Ergonomics	Lifting and bending	<ul style="list-style-type: none"> - Buddy system/Proper lifting techniques - No individual lifting over 40 lbs.

Activity Hazard Analysis		
JOB TASK: DECONTAMINATION OPERATIONS		
PERSONAL PROTECTIVE EQUIPMENT: LEVEL C / MOD D BASED ON AIR MONITORING RESULTS		
Hazard	Sources	Control Measures
Struck by/caught between	Vehicle & Equipment Operation/Traffic	<ul style="list-style-type: none"> - Follow HS-10 Motor Vehicle Operation - Follow HS-18 Heavy Equipment Operation - Ensure outriggers are properly positioned for wheeled excavator/equipment - Only qualified drivers permitted to operate vehicles - Wear ANSI Type 2 high-visibility safety vest - Wear seat belts while in operation - Back up alarms functional and loud enough to hear over surroundings - Ground personnel are not allowed within swing radius of equipment while in operation - Personnel must establish eye contact with operator and operator must disengage and remove hands from controls prior to entering the swing radius
Heat/Cold Stress	Seasonal Temperatures/ Work in protective garments	<ul style="list-style-type: none"> - Cool/Warm break areas - Follow ER SOP HS-17 - Follow ER SOP HS-5 - Plenty of Fluids & breaks
Noise	Heavy Equipment, Diaphragm Pumps, Air compressor, Hand Tools	<ul style="list-style-type: none"> - Hearing protection required at all times when working near pumps, air compressors, hand tools and heavy equipment above 85db
Electrocution	Power tools/equipment	<ul style="list-style-type: none"> - Inspect all power cords prior to use - Use GFCI on all connections
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear cut resistant gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Structure/roof trusses Uneven terrain/debris	<ul style="list-style-type: none"> - Keep area organized - Identify/mark hazards - Remove debris from walking/ working surfaces

4.3 Physical Hazards

Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
Electrical	<ol style="list-style-type: none"> 1. Locate and mark existing energized lines. 2. De-energize lines if necessary to perform work safely. 3. All electrical circuits will be grounded. 4. All 120 volt single phase which are not a part of the permanent wiring will have a ground-fault interrupter in place. 5. Temporary wiring will be guarded, buried or isolated by elevation to prevent accidental contact by personnel or equipment. 6. Evaluate potential for high moisture/standing water areas and define special electrical wiring needs-typically requirement for low voltage lighting systems. 	<ol style="list-style-type: none"> 1. Utilize Qualified Electrical Contractor for any new or temporary electrical construction. 2. Ensure electrical equipment/material meet all local, state and federal code and specifications 3. Use GFCI for all power tool usage. 4. All electrical cords must be inspected for damage prior to each use
Ergonomic	<ol style="list-style-type: none"> 1. All operations evaluated for ergonomic impact. 2. Procedures written to define limits of lifting, pulling, etc. 3. Procedures to define how personnel will utilize proper ergonomic concepts and utilize mechanical material handling equipment. 4. Necessary mechanical material handling equipment specified and ordered for project. 	<ol style="list-style-type: none"> 1. Proper body mechanics techniques stressed and enforced on a daily basis. 2. Mechanical handling equipment maintained and utilized. 3. Proper body mechanics stressed in scheduled safety meetings. 4. Injuries reported and medically treated if in doubt about severity. 5. Operations changed as necessary based on injury experience or potential. 6. Manual Lifting/Handling Heavy Objects Buddy system

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Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
Existing Site Topography	<ol style="list-style-type: none"> 1. Survey site prior to layout. Identify areas unsafe for personnel or equipment due to physical conditions. 2. Identify/locate existing utilities. 3. Determine impact of site operations on surrounding properties, communities, etc. 4. Identify mechanized equipment routes both on site and onto and off the site. 5. Layout site into exclusion and contamination reduction zones based on initial site evaluation. 	<ol style="list-style-type: none"> 1. Awareness to work environment - regular inspection/audits to identify changing conditions. 2. Shut down operations when unknown conditions encountered.
Fires & Explosions	<ol style="list-style-type: none"> 1. Evaluate all operations for fire and explosion potential. 2. Define specific procedures for unique operations presenting unusual hazard such as flammable tank demolition. 3. Ensure that properly trained personnel and specialized equipment is available. 4. Define requirements for handling and storage of flammable liquids on site, need for hot work permits and procedures to follow in the event of fire or explosion. 5. Define the type and quantity of fire suppression equipment needed on site. 6. Coordinate with local fire fighting agencies to discuss unique fire hazards, hazardous materials, etc. 7. Ensure site operations comply with 29CFR 1910.157(g). 	<ol style="list-style-type: none"> 1. Inspect fire suppression equipment on a regular basis. 2. Store flammables away from oxidizers and corrosives. 3. Utilize Hot Work Permit for all hot work on-site. 4. Follow any site specific procedures regarding work around flammables. 5. Review and practice contingency plans. 6. Discuss on regular basis at scheduled safety meetings.
Flammable Vapor and Gases	<ol style="list-style-type: none"> 1. Evaluate site to determine sources of likely flammable gas or vapor generation. 2. Develop specific procedures to be followed in the event of exposure to flammables. 3. Specify specialized equipment needs for inerting flammable atmospheres, ventilating spaces and monitoring flammable vapor concentrations. 4. Define requirements for intrinsically safe equipment. 5. Develop contingency plan to follow in the event of fire or explosion. 	<ol style="list-style-type: none"> 1. Calibrated monitoring equipment available and utilized by trained personnel whenever working where flammable gas or vapor is present. 2. Monitoring performed at regular frequency and in all areas where vapor could generate or pool. 3. Equipment and operations shut down when threshold levels are exceeded. 4. Contingency plans reviewed regularly by all involved personnel. 5. Work areas are carefully inspected to look for possible ignition sources. Sources are removed. 6. Operations shut down if specific task procedures can't be followed to the letter. 7. Fire Extinguishers
Heavy Equipment Operation	<ol style="list-style-type: none"> 1. Define equipment routes and traffic patterns for site. 2. Insure that operators are properly trained on equipment operation for all equipment required on project. 3. Define safety equipment requirements, including back up alarm and roll over, for all equipment on site. 4. Define equipment routes and traffic patterns for site. 5. Implement SOP of requiring operators to safety inspect equipment on a daily basis in accordance with manufacturer requirements. 6. Evaluate project requirements to ensure that equipment of adequate capacity is specified. 	<ol style="list-style-type: none"> 1. Equipment inspected as required. 2. Equipment repaired or taken out of service. 3. Ground spotters are assigned to work with equipment operators. 4. Utilize standard hand signals and communication protocols. 5. Personnel wear the proper PPE; utilize hearing protection, gloves for handling rigging, etc. 6. Equipment safety procedures discussed at daily scheduled safety meetings. 7. Personnel do not exceed lifting capacities, load limits, etc. for equipment in question. 8. Personnel follow basic SOP's which prohibit passengers on equipment, activating brakes and grounding buckets, securing loads prior to movement, etc. 9. Heavy Equipment Operations ER SOP
Illumination	<ol style="list-style-type: none"> 1. Evaluate all operations and work areas to determine lighting requirements. 2. Specify specialized lighting requirements including explosion proof, intrinsically safe, lighting needs. 3. Determine if nighttime outdoor operations are necessary. 	<ol style="list-style-type: none"> 1. Inspect specialized equipment and discard or replace as needed. 2. Add additional lighting to areas with lighting deficiencies. 3. Inspect drop cords and portable lights on

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Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
	<ol style="list-style-type: none"> Evaluate tasks to be performed and number of light plants necessary to allow operations. Ascertain if outdoor lighting from nighttime operations will have an impact on surrounding communities. 	<ol style="list-style-type: none"> regular basis. Replace or repair as necessary. Illumination
Noise	<ol style="list-style-type: none"> Local community noise standards examined. Expected loud operations evaluated to determine compliance with community standards. Loud operations scheduled for approved time periods. Noise level standards established for equipment brought onto site. Hearing protection requirements defined for personnel expected to have excessive exposures. 	<ol style="list-style-type: none"> Personnel receive annual audiogram. Personnel required to wear hearing protection. Routine noise level monitoring and dosimetry performed. Defective equipment repaired as needed. Ongoing hearing conservation education promoted at scheduled safety meetings. Medical evaluation following noise (impact) exposure if symptoms present themselves. Sec. 7.0 – Weston ECH&S Program Manual Occupational Noise & HC Program
Personal Injuries	<ol style="list-style-type: none"> Site operations will be evaluated for exposures with serious injury potential such as falling objects, pinch points, flying objects, falls from elevated surfaces, etc. A written Fall Prevention Program will be developed if workers will be required to work at heights greater than 6 feet from unguarded work locations. PPE requirements will be based on potential for injury. 	<ol style="list-style-type: none"> Personnel will wear required PPE. Specialized equipment such as rope grabs, winches, etc. will be inspected prior to each use. Defective equipment will be immediately replaced. All injury and near miss incidents will be reported to the SHSO. First aid/CPR trained person on site at all times. First aid on site. Transport for medical care if necessary. Bloodborne Pathogens Exposure Control Plan for First Aid Providers
Small Equipment Usage	<ol style="list-style-type: none"> Site operations will be evaluated to determine need for specialized intrinsically safe, explosion-proof and UL approved equipment and instruments. Implement requirement for G.F.I., double insulated tool usage, or assured grounding program in all outdoor operations, will be utilized. Specify equipment needs to ensure that equipment used only for the purpose for which it is designed and to prevent abuse or misuse of the equipment. Specify requirements for the inspections and maintenance of specialized equipment. Specify that all equipment utilized on the project meets all OSHA requirements. 	<ol style="list-style-type: none"> Inspect each tool prior to each use. Ensure all guards are in use and properly positioned. Ensure item being worked on is properly braced if necessary. Get help when appropriate to hold or brace item being worked on. Wear leather or other appropriate gloves in addition to level C PPE. FLD-38 Hand & Power Tool Usage
Weather Conditions	<ol style="list-style-type: none"> Evaluate prevailing weather conditions for the site. Contingency plans developed for likely severe weather conditions such as tornado, and extreme thunderstorm. Provide for daily weather forecast service in extreme weather areas. Plan to weatherize safety systems, such as showers and eye washes that would be impacted by extreme cold weather. Order necessary specialized cold weather clothing. Grounding and bonding requirements defined for thunderstorm areas. Sheltered air conditioned break areas provided for extreme hot and cold weather zones. 	<ol style="list-style-type: none"> Employees trained in contingency plan for severe weather conditions. Emergency water sources inspected regularly in cold areas. Weather service contacted regularly during storm conditions. Supervisory personnel cease operations during extreme storm conditions (i.e., thunderstorms). Personnel evacuate to safe assembly area. Incident Weather Lighting strikes within 5 miles of site require 30 minute suspension from every strike thereafter.
Heat Stress	<ol style="list-style-type: none"> Anticipate possible high temperatures (summer months). Be aware of heat stress symptoms, quit sweating, pale, clammy skin, dizziness 	<ol style="list-style-type: none"> Cool break area. Drink water. Buddy system/ awareness First aid on site. Medical care if symptoms persist. Heat Stress Prevention/Monitoring

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Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
Cold Stress	<ol style="list-style-type: none"> 1. Anticipate possible low temperatures (winter months). 2. Remember the temperature does not have to be below freezing to have a cold stress situation. 	<ol style="list-style-type: none"> 1. Warm break area. 2. Warm decaffeinated drinks. 3. Buddy system/ awareness. 4. First aid on site. 5. Medical care if symptoms persist 6. Cold Stress

Please see HS-35 for physical hazards regarding waste bulking if necessary.

5.0 TRAINING REQUIREMENTS

This section describes ER's project training requirements and site visitor policy. Training of all personnel shall be in accordance with OSHA 29 CFR 1910.120 and the National Fire Protection Association (NFPA) standards.

5.1 Project Training Requirements

The training listed in Table 5-1 will be provided to project participants as noted. All required training will be documented and this documentation maintained onsite.

Project Training Requirements:		
Topic	Description	Personnel
General Training		
Site Safety and Health Plan	Site-specific hazards and control requirements, before commencement of field work. Includes training in proper use and care of PPE.	All project personnel
Activity Hazard Analysis	Activity-specific hazards, controls and training requirements for a specific phase or activity, prior to commencement of activity	Workers, supervisors and oversight personnel engaged in the activity
Daily Safety Briefing	In addition to plan-of-the-day and daily hazard reminders, often used to cover a specific topic; provided refresher training on various issues; or changes in hazards, controls or procedures.	All field workers, supervisors and field oversight personnel
Emergency Action Plan	Roles, responsibilities, recognition of emergency conditions, reporting and notification, evacuation and other procedures.	All project personnel, with detailed information on procedures for workers with special responsibilities
OSHA 40-Hour Hazardous Waste Operation (HAZWOPER) Training	General hazards and controls for hazardous waste activities at remediation sites, prior to performing work in an exclusion zone.	General site workers, supervisors, oversight personnel on HAZWOPER sites
OSHA 8-Hour Supervisor	Managing HAZWOPER work activities	Supervisors and management support staff on HAZWOPER sites
OSHA 8-Hour Refresher	Current annual refresher for HAZWOPER sites.	Workers, supervisors and oversight personnel engaged in the activity
Hazard Communication	Requirements for MSDS, labels; hazards of site materials and controls; location of and access to inventories and MSDS.	All project personnel potentially exposed to hazardous materials
Fire Extinguisher	General education on selection, distribution, and proper use of fire extinguishers.	All project personnel

Project Training Requirements:		
Topic	Description	Personnel
Special Training		
First aid/ Cardiopulmonary Resuscitation (CPR)	Red Cross, National Safety Council or other authorized course, with current refresher	At least 2 project personnel
Fall Protection	Fall (from elevation) hazards, fall protection techniques, especially proper use of personal fall arrest systems and rescue procedures.	Task-specific, workers exposed to fall hazards.
Lockout/Tagout	Site-specific energy control and verification procedures.	Authorized personnel working on de-energized systems, and affected employees whose work may be impacted by a lockout/tagout situation.
Other Heavy Equipment operations	Qualified by Construction Manager, Superintendent or Equipment Supervisor as documented on ER Equipment Operator Qualifications Form	Equipment Operators
Power tools (e.g. chain saws, chippers, powder-actuated tools, compressed air systems)	Hazards and proper use and maintenance as described in operations manual. Power-operated tool users certified by manufacturer.	Tool users

5.2 Visitor Indoctrination Policy

All site visitors will be required to review the daily tailgate safety issues and sign the visitor log. At a minimum, all visitors must be informed of the anticipated hazards and PPE requirements, designated work zones, escort procedures, and emergency procedures.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The following is a brief description of the personal protective equipment, which may be required during various phases of the project. The U.S. EPA terminology for protective equipment will be used; Levels A, B, C and D.

Respiratory protective equipment shall be NIOSH-approved and use shall conform to OSHA 29 CFR Part 1910.134 Requirements. Each employer shall maintain a written respirator program detailing selection, use, cleaning, maintenance and storage of respiratory protective equipment. The written Respirator Program will be maintained at the local and regional offices.

6.1 Level A Protection Shall Be Used When: (NOT ANTICIPATED)

- The extremely hazardous substance requires the highest level of protection for skin, eyes and the respiratory system;
- Substances with a high degree of hazard to the skin are known or suspected;
- Chemical concentrations are known to be above Immediately Dangerous to Life and Health (IDLH) levels; or,
- Biological hazards requiring Level A are known or suspected.

6.2 Level B Protection Shall Be Used When:

- The substance(s) has been identified and requires a high level of respiratory protection but less skin protection;
- Concentrations of chemicals in the air are IDLH or above the maximum use limit of an APR with full-face mask;
- Oxygen deficient or potentially oxygen deficient atmospheres (<19.5%) are possible; and/or, Confined space entry may require Level B.
- Incomplete identification of gases and vapors, but not suspected to be harmful to skin or skin absorbable

Level B Protective Equipment at a Minimum Shall Consist of:

SCBA / Cascade System	Full Face
Chemical Resistant/Protective Coveralls (type)	Saranex / Acid Suits*
Inner Gloves (type)	Nitrile
Outer Chemical Gloves (type)	Nitrile
Outer Work Gloves (type)	Leather**
Safety Shoes/Boots (type)	Chemical resistant steel toed
Hard Hat	ANSI approved
Modifications:	* Acid suits will be used during liquid transfer activities.
	** Cut resistant gloves will be used when handling metal and other sharp objects.

6.3 Level C Protection Shall Be Used When:

- The same level of skin protection as Level B, but a lower level of respiratory protection is required;
- The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove contaminants; or,
- The substance has adequate warning properties and all criteria for the use of APR respirators has been met

Level C Protective Equipment at a Minimum Shall Consist of:

Air Purifying Respirator	Full face
Cartridges	OV/P100
Chemical Resistant/Protective Coveralls	Saranex / Acid suits*
Inner Gloves	Nitrile
Outer Chemical Gloves	Nitrile
Outer Work Gloves	Leather**
Safety Shoes/Boots	Chemical protective boot covers
Hard Hat	ANSI approved
Reflective Safety Vests	ANSI Type 2 high-visibility
Modifications:	* Acid suits during liquid transfer and sludge handling.

** Cut resistant gloves will be used when handling metal and other sharp objects.

6.4 Modified Level D Protection Shall Be Used When:

- The atmosphere is demonstrated to be within OSHA permissible limits
- Work functions preclude splashes, immersion or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Mod Level D Protection Equipment at a Minimum Shall Consist of:

Chemical Resistant/Protective Coveralls	Breathable SMS or equivalent
Safety Shoes/Boots	Steel toed/shank
Boot Covers (booties)	Latex
Work Gloves	Cotton or Leather**
Hard Hat	ANSI approved
Face Shield***	As necessary
Reflective Safety Vests	ANSI Type 2 high-visibility
Safety Glasses	NIOSH approved
Modifications:	** Cut resistant gloves will be used when handling metal and other sharp objects.
*** face screen ear muffs and cut proof chaps	
During chainsaw operation	

6.5 Level D Protection Shall Be Used When:

- The atmosphere is demonstrated to be below OSHA permissible exposure limits
- Work functions preclude splashes, immersion or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Level D Protection Equipment at a Minimum Shall Consist of:

Standard Work Clothing	Long pants/sleeved shirt
Safety Shoes/Boots	Safety Toed/shank
Boot Covers (booties)	As Needed
Work Gloves	Leather or cut resistant
Hard Hat	ANSI approved
Face Shield	As Needed
Safety Glasses	ANSI approved
Reflective Safety Vest	ANSI Type 2 high-visibility
Modifications:	** Cut resistant gloves will be used when handling metal and other sharp objects.

6.6 Decisions to Upgrade/Downgrade PPE

All decisions to downgrade from Level B to C or D must be accompanied by air monitoring results. The Site Safety officers and ER H&S Managers must be advised of on-site decisions to downgrade. All decisions must be documented with an Addendum to the Plan.

The following conditions will necessitate reevaluation of PPE use.

- commencement of a new work not previously identified
- change of job tasks during a work phase
- change of season/weather
- contaminants other than those identified in Safety Plan
- change in ambient levels of contaminants (Real time and PEM)
- change in work which affects degree of chemical contact

6.7 Project Personal Protective Equipment Requirements

Project Personal Protective Equipment Requirements:**						
Activity	Respiratory Protection	Body Protection	Hand Protection	Eye/Face Protection	Foot Protection	Hearing Protection
Site Mobilization/staging & Backfilling (Level D)	None	None	Leather work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when >85 dBA
Waste / Drum Sampling / Handling / Equipment Decon (Level C)	Full-face Air-purifying respirator with OV/P100 /AG cartridges	Tyvek or equivalent	Nitrile inner/outer gloves	Full-face Respirator	Chemical resistant boots	Plugs or muffs when >85 dBA
Excavation/mixing Loading soil (Level C)	Full-face Air-purifying respirator with OV/P100 /AG cartridges	Tyvek or equivalent	Nitrile inner/outer gloves	Full-face Respirator	Chemical resistant boots	Plugs or muffs when >85 dBA
Surface and Subsurface Soil Sampling (Level D)	None	Long Sleeved Shirt	Leather or Nitrile gloves as based on activity	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when >85 dBA
Work Zone Air Monitoring	Consistent with Task/ Activity	Consistent with Task/ Activity	Consistent with Task / Activity	Consistent with Task/ Activity	Consistent with Task/ Activity	Consistent with Task / Activity
Demobilization (Level D)	None	None	Leather work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when >85dBA

**** Level B PPE will be utilized for ALL Hazard Classification of UNKNOWN drums , if discovered on the Site. PPE upgrade during surface/subsurface soil sampling based on air monitoring results.**

Personal Protective Equipment Inspection and Care:

Inspection and care of PPE are covered in the ER Corporate SOP HS-24.

6.8 Respiratory Protection Program

SESCO shall implement the SESCO Respiratory Protection Program for its employees and subcontractors and train them on its contents. The program will be administered by the SHSO.

Respiratory protective equipment shall be NIOSH-approved and use shall conform to OSHA 29 CFR Part 1910.134 Requirements. SESCO and subcontractors shall maintain a written respirator program detailing selection, use, cleaning, maintenance and storage of respiratory protective equipment.

7.0 MEDICAL MONITORING REQUIREMENTS

7.1 *Pre-Employment Medical Examination*

- a. Pre-employment medical examinations are required for persons working at hazardous waste sites.
- b. All examinations must be completed and documented prior to assignment to this site.
- c. All examinations will be conducted following parameters established by WorkCare™.

7.2 *Site Specific Medical Examination*

- a. BLL / ZPP for site activities with potential exposure to lead >30 days in calendar year.
- b. Cadmium BL
- c. Arsenic Urine

7.3 *Annual Medical Examination*

The medical examination must have been within a 6-month period prior to on-site activity and repeated annually.

7.4 *Suspected Exposure Medical Examination*

- a. Following any suspected uncontrolled exposure to site contaminants, personnel should be scheduled for a special medical examination.
- b. The medical examination will be specific for the contaminants and the associated target organs or physiological system.
- c. Questions regarding the type of medical examination can be directed to ER's Vice President, Health and Safety.

7.5 *Contractor Medical Examination Requirements*

All subcontractors entering the contamination reduction or exclusion zone will have adequate medical surveillance satisfying 29 CFR 1910.120.10 (f).

8.0 *Health and Hazard Monitoring*

According to 29 CFR 1910.120 (h) Air Monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on-site.

8.1 Routine Air Monitoring Requirements

- Upon initial entry to rule out IDLH conditions;
- When the possibility of an IDLH condition or flammable atmosphere has developed;
- When work begins on a different portion of the site;
- Contaminants other than those previously identified are being handled;
- A different type of operation is initiated;
- Employees are handling leaking drums or containers or working in areas with obvious liquid contamination; and,
- During confined space work.

Air monitoring will consist at a minimum of the criteria listed below. All air monitoring data will be documented and available in the command post site files for review by all interested persons. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications. Calibration and maintenance performed will be entered in the site log and/or instrument log book.

8.2 Site Specific Air Monitoring Requirements

Monitoring:					
Real Time (Air, noise, heat, radiation, light)					
Activity	Target Analyte	Instrument	Frequency	Action Levels	Actions/Upgrade and Rationale
1. Site Setup	Flammable atmosphere	Combustible Gas Indicator (MultiRAE Plus) (AreaRAE)	Initial and periodic	> 10% LEL Evacuate area/space	Evacuate area Ventilate
2. Soil Excavation			Continuous during CSE		
3. Soil Sampling / Loading	VOCs	Photo – ionization Detector (PID) (MultiRAE Plus) (AreaRAE)	Initial transfer and periodic	Background – < 25 ppm	Level D
4. Drum Handling / Sampling			Continuous during CSE	25 ppm - 50 ppm Level C	Air-purifying respirator
5. Backfill				50 ppm - <250ppm Level C or Level B based on constituent PEL	Supplied-air respiratory protection
6. Decontamination				>250 ppm	Evacuate area, until conditions subside
	Oxygen	O ₂ Meter (MultiRAE Plus) (AreaRAE)	Initial Continuous during CSE	<19.5% and >23.5% O ₂ Evacuate area/space	Evacuate area
During all site activities	Particulates	DataRam	Periodic / Daily(perimeter of the Site)	>2.5 mg/m3 (1/2 PEL)	Apply dust suppression engineering controls
Site wide	Temperature Extremes Cold/Heat stress	N/A – Engineering controls in place	Periodic breaks w/ fluids	Variable depending on the individual and work activity	Participate in Cold / heat stress monitoring program, take breaks in the warmth / shade, drink fluids as allowed

* The reading must be sustained for at least one (1) minute in the breathing zone.

8.3 Integrated Personal Exposure Monitoring:

Integrated personal exposure monitoring is anticipated due to site contaminants. Refer to Attachment D.

9.0 SITE CONTROL AND GENERAL FIELD SAFETY RULES

9.1 Work Zones

The primary purpose for site controls is to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas and to prevent access or exposure to hazardous materials by unauthorized persons.

At the end of each workday, the site should be secured or guarded, to prevent unauthorized entry. All areas of the site with access to the public will be closed by barricades.

Site work zones will include:

Clean Zone/Support Zone (SZ)

This uncontaminated support zone or clean zone will be the area outside the exclusion and decontamination zones and within the geographic perimeters of the site. This area is used for staging of materials, parking of vehicles, office and laboratory facilities, sanitation facilities, and receipt of deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the exclusion zone. All personnel arriving in the support zone will upon arrival, report to the command post and sign the site entry/exit log. There will be one controlled entry/exit point from the clean zone to the decontamination zone.

- 1) Location of Clean Zone: See attached site map

Contamination Reduction Zone (CRZ)

The contamination reduction zone will provide a location for removal of contaminated personal protective equipment and final decontamination of personnel and equipment. All personnel and equipment should exit via the decontamination area. A separate CRZ area will be established for heavy equipment.

- 1) The CRZ is a buffer zone between contaminated and clean areas and will be identified by yellow banner guard or barricade fencing.
- 2) Decontamination line is located: Where appropriate depending on location of work within facility

Exclusion Zone/Hot Zone (EZ) : Inside the orange fence boundary line

The exclusion zone will be the "hot-zone" or contaminated area of the site. Entry to and exit from this zone will be made through a designated point and all personnel will be required to sign the hot zone entry/exit log

located at the decon area. Appropriate warning signs to identify the EZ should be posted (i.e. "DANGER - AUTHORIZED PERSONNEL ONLY," "PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT," etc.) Exit from the EZ must be accompanied by personnel and equipment decontamination as described in Section 10.0.

- 1) Will be identified by red banner guard or signs.
- 2) General Safety Rules for EZ
 - a. wear the appropriate level of PPE defined in plan
 - b. do not remove any PPE
 - c. no smoking, eating or drinking
 - d. no horseplay
 - e. no matches or lighters
 - f. implement the communication and line of sight system

9.2 General Field Safety Rules

- Horseplay is not permitted at any time.
- All visitors must be sent to the command post.
- It is ER policy to practice administrative hazard control for all site areas by restricting entrance to exclusion zones to essential personnel and by using operational SOPs.
- Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Stay away from any waste drums unless necessary. Protect equipment from contamination by bagging.
- Eating, drinking, or smoking is permitted only in designated areas in the support zone.
- Hands and face must be thoroughly washed upon leaving the decontamination area.
- Cell phone use is not allowed in EZ, unless authorized by Response Manager or SHSO.
- Cell phone use while operating equipment is not allowed.
- Cell phone use while operating motor vehicles must comply with applicable DOT regulations
- Beards or other facial hair that interferes with respirator fit will preclude wearing a respirator.
- All equipment must be decontaminated or discarded upon exit from the exclusion zone.
- All personnel exiting the exclusion zone must go through the decontamination procedures described in Section 10.0.
- Safety Equipment described in Section 6.0 will be required for all field personnel.
- Personnel will only travel in vehicles where individual seats for each occupant are provided.
- Seat belts will be worn as required.
- Fire extinguishers will be available on site and in all areas with increased fire danger such as the refueling area.
- A minimum of two personnel will always be on site whenever heavy equipment is operated.
- Only necessary personnel need to be on or around heavy equipment.
- Employees will not interfere with or tamper in any way with air monitoring equipment.
- Backhoes or other equipment with booms shall not be operated within 10 feet of any electrical conductor

Minimum Clearance from Energized Overhead Electric Lines

NOMINAL SYSTEM VOLTAGE	MINIMUM REQUIRED CLEARANCE
0-50 kV	10 feet
51-100 kV	12 feet
101-200 kV	15 feet
201-300 kV	20 feet
301-500 kV	25 feet
501-750 kV	35 feet
751-1000 kV	45 feet

- Visitor log will be maintained at the command post or with the security guard. All personnel coming on site will sign in and out on a daily basis.
- Security will be maintained at the site by closing all gates during normal work hours. Site will be locked up in the evening.
- If unauthorized members of the public are found on site, contact RM immediately and do not leave the individual unattended.
- Visitors are not allowed in the work areas without authorization. Visitors must sign in at the Command Post and receive authorization to enter the site.
- Buddy System
 - The buddy system is mandatory at anytime that personnel are working in the exclusion zone, remote areas, on tanks, or when conditions present a risk to personnel.
 - A buddy system requires at least two trained/experienced people who work as a team and maintain at a minimum audible and/or visual contact while operating in the exclusion zone.
- Communication Procedures
 - Radios will be used for onsite communications and Channel 4 will be the designated channel.
 - The crews should remain in constant radio or visual contact while on site.
 - The site evacuation signal will be 3 blasts on the air or vehicle horn.

10.0 DECONTAMINATION PROCEDURES

In general, everything that enters the EZ at this site must either be decontaminated or properly discarded upon exit from the EZ. All personnel, including any state and local officials must enter and exit the EZ through the CRZ. Prior to demobilization, contaminated equipment will be decontaminated and inspected before it is moved into the SZ. Any material that is generated by decontamination procedures will be stored in a designated area in the EZ until disposal arrangements are made.

NOTE: The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for this site is water. Decontamination solution will be changed daily (at a minimum) and collected and stored on-site until disposal arrangements are finalized.

10.1 Procedures for Equipment Decontamination

Following decontamination and prior to exit from the EZ, the RM shall be responsible for ensuring that the item has been sufficiently decontaminated. This inspection shall be included in the site log.

Equipment decontamination will consist of the following steps: Clean with soap and water solution.

10.2 Procedure for Personnel Decontamination

This decontamination procedure applies to personnel at this site wearing Level B and C protection. These are the minimum acceptable requirements:

Station 1: Equipment Drop

Deposit equipment used on-site (tools, sampling devices and monitoring instruments, radios, etc.) on plastic drop cloths. These items must be decontaminated or discarded as waste prior to removal from the EZ.

Station 2: Outer Boot and Outer Glove Wash and Rinse

Scrub outer boots, outer gloves and/or splash suit with decontamination solution or detergent water. Rinse off using water.

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves. If outer boots are disposable, deposit in container with plastic liner. If not disposable, store in a clean dry place.

Station 4: Outer Garment Removal

If applicable, remove SCBA and remain on air as long as possible. Remove Chemical Resistant Outer Garments and deposit in container lined with plastic. Decontaminate or dispose of splash suits as necessary.

Station 5: Respiratory Protection Removal

Remove hard-hat, face-piece, and if applicable, deposit SCBA on a clean surface. APR cartridges will be discarded as appropriate. Wash and rinse respirator at least daily. Wipe off and store respiratory gear in a clean, dry location.

Station 6: Inner Glove Removal

Remove inner gloves. Deposit in container for disposal.

Station 7: Field Wash

Thoroughly wash hands and face with soap and water. Shower as soon as possible.

Eating, drinking, chewing gum/tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and/or ingestion of materials is prohibited in any areas where the possibility of contamination exists and is permitted only in the designated break area.

Personnel will not wear or bring contaminated clothing into the break areas.

10.3 *Disposition of Decontamination Wastes*

1. All equipment and solvents used for decontamination shall be decontaminated or disposed of with the established waste streams.
2. Commercial laundries or cleaning establishments that decontaminate or are used to launder contaminated clothing shall be informed of the presence and potentially harmful effects of the contaminants.

11.0 HAZARD COMMUNICATION

Each contractor will be responsible for maintaining a copy of their Hazardous Communication Program and MSDS' on site. The following items are specific to this job site:

11.1 *Material Safety Data Sheets*

- [1] Material Safety Data Sheets will be maintained at the Command Post in the Health and Safety Binder or readily available electronically.
- [2] MSDS' will be available to all employees for review during the work shift.
- [3] See Attachment C and/or the ER Health and Safety Binder or on computer.

11.2 *Container Labeling*

- [1] All containers received on site will be inspected by the contractor using the material to ensure the following:
 - a. all containers clearly labeled
 - b. appropriate hazard warning
 - c. name and address of the manufacturer

11.3 *The following chemicals may be brought to the site:*

- [1] Gasoline
- [2] Diesel Fuel
- [3] Oil
- [4] Antifreeze
- [5] Lubricants
- [6] Calibration Gas Cylinders
- [7] Isopropyl Alcohol (equipment decon)

11.4 *Employee Training and Information*

- [1] Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following:
 - a. an overview of the requirements contained in the Hazardous Communication Standard
 - b. hazardous chemicals present at the site
 - c. the location and availability of the written Haz Com Program
 - d. physical and health effects of the hazardous chemicals
 - e. methods of preventing or eliminating exposure
 - f. emergency procedures to follow if exposed

- g. how to read labels and review MSDS' to obtain information
- h. location of MSDS file and location of hazardous chemical list

See ER Health and Safety Binder for Hazard Communication Program and applicable MSDS'.

12.0 EMERGENCIES/INCIDENTS/INJURIES

It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

12.1 Emergency Contacts

Emergency Call List and Project Organization		
Service	Name/Organization	Emergency Phone
Fire/Police/Emergency Medical		911
Police		911
Sheriff		911
*Hospital – ER	Saint Joseph 138 N Dixon Road Kokomo, IN	765-868-1089
Client Representative	USEPA OSC/ Shelly Lam	317-417-0980
SESCO Response Manager	Heidi Meyer	317-696-3734
ER SHSO	Nick Michailides	219-286-5359
SESCO Project Manager	Brad Adams	317-847-9973

*Directions from Site to Hospital and Clinic: (See Map in Attachment B)

NOTE: Maps and directions to the hospital and clinic will be posted in the office and kept in site vehicles.

Distance from site to hospital is approximately 1 miles. Driving time is approximately 2-5 minutes.

The following individuals have been trained in CPR and First Aid: Heidi Meyer (SESCO); Nick Michailides (ER)

12.2 Additional Emergency Numbers

Poison Control Center	800-222-1222
National Response Center	800-424-8802 (24 hr)
Center for Disease Control	404-488-4100 (24 hr)
AT&F (Explosives Information)	800-424-9555
Chemtrec	800-424-9300
USEPA Region 5 ER Duty Officer	312-353-2318 (24 hr)

IDEM Spill Line 888-233-7745
WorkCare Incident Intervention 888-449-7787 (24 hr)

SESCO Corporate Contacts

Bill Pickard 317-554-9247
Brent Graves 317-908-4645
Darren Reese 765-517-1516

ER Corporate Contacts

ER Corporate 24 Hour Hotline 888-814-7477
ER Headquarters (St. Louis) 636-227-7477

12.3 Emergency Equipment Available On-Site

Communications Equipment	Location
Private Telephones	N/A
Mobile Telephones	RM – Heidi Meyer; SHSO – Nick Michailides
Two-Way Radios	None on site
Emergency Alarms/Horns	Vehicle Horns / Air Horn
Other:	

Medical Equipment	Location
First Aid Kits	Site Vehicles / Command Post Area
Stretcher/Backboard	N/A
Eye Wash Station: (within 100 feet of hazard zone)	CRZ/Command Post Area
Safety Shower	CRZ (if warranted)

Fire Fighting Equipment	Location
Fire Extinguishers	Site Vehicles / Command Post Area/CRZ / Spark operations
Other	Flammables storage area

Spill or Leak Equipment	Location
Absorbent Boom/Pads:	Support Zone/Trailer
Dry Absorbent:	Support Zone/Trailer

12.4 Incident Reporting/Investigations

- All incidents, including personal injury and property damage, must be reported to the RM, Supervisor, or SHSO within **20 minutes of incident**.
- The RM will contact SESCO Project manager by telephone immediately. The RM, SHSO, and effected employees will conduct an immediate investigation of the incident and document all results on the Incident and Investigation Report form (ER or equivalent).

- The RM will assign a supervisory individual to accompany all injured personnel to the clinic and follow guidelines outlined in the ER Return to Work Program (or equivalent for SESCO employees and Subcontractors other than ER).
- Copies of all Incident and Investigation Reports will be sent to the SESCO Project Manager.
- Copies of all II reports involving ER employees will be forwarded to ER VP of H&S.

13.0 EMERGENCY RESPONSE CONTINGENCY PLAN

13.1 Personnel Responsibilities

As the administrator of the project, the RM has primary responsibility for responding to and correcting emergency situations. The RM will:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, total evacuation and securing of the site or up-grading or down- grading the level of protective clothing and respiratory protection.
- Take appropriate measures to protect the public and the environment including isolating and securing the site, preventing run-off to surface waters and ending or controlling the emergency to the extent possible.
- Ensure that appropriate Federal, State and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted.
- Ensure that appropriate decon treatment or testing for exposed or injured personnel is obtained.
- Determine the cause of the incident and make recommendations to prevent the recurrence.
- Ensure that all required reports have been prepared and submitted.

13.2 Medical Emergencies:

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to SESCO Project Manager.

Onsite First Aid Support

Onsite medical support during project execution will be available from two or more individuals who are trained in First Aid and Cardiopulmonary Resuscitation (CPR) and bloodborne pathogens.

Onsite first aid kits shall be Type III, 16 unit kits, including one pocket mouthpiece or CPR barrier. Kits shall be checked prior to use, and at least weekly when work is in progress to ensure that contents are replaced as used.

Medical Transport of Employees and Case Management

For non-emergency injuries, a local clinic will be identified with the assistance of the Corporate Medical Consultant; WorkCare Incident Intervention (II) will be contacted immediately to establish a medical treatment plan prior to transporting the injured worker to the clinic. The WorkCare II consultant will attempt to contact the clinic ahead of the arrival of the patient to establish oversight of case management. Under no circumstances will an injured employee drive unescorted to a hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The HSO or other project management personnel will transport the injured person to the facility. The employee who transports the injured person shall be trained in first aid and CPR whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance.

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written return to work statement from the treating physician. This statement shall supply a medical diagnosis of the problem, the date of return to work, and work limitations. Should a return to work statement such as "light duty" be given, the treating physician will be contacted to determine the specific limitation. ER will make an assessment of work the employee normally performs whether or not the limitation interferes with the employee's normal work.

Whenever there are questions on the appropriateness of the diagnosis or prescribed course of treatment, WorkCare will be contacted to arrange for a second opinion. Copies of all Incident and Investigation Reports will be sent to the ER Corporate Health and Safety Manager.

13.3 Fire or Explosion:

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival the RM or designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on- site.

If it is safe to do so, site personnel may:

- Use firefighting equipment available on site.
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

13.4 Spills, Leaks or Releases:

In the event of a spill or a leak, site personnel will:

- Locate the source of the spillage and stop the flow if it can be done safely.
- Begin containment and recovery of the spilled materials.

13.5 Evacuation Routes and Resources:

- Evacuation routes have been established by work area locations for this site. All buildings and outside work areas have been provided with two designated exit points. Evacuation should be

conducted immediately, without regard for equipment under conditions of extreme emergency. See site map for evacuation routes.

- Evacuation notification will be three blasts on an air horn, vehicle horn, or by verbal communication via radio.
- Keep upwind of smoke, vapors or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation is not via the decontamination corridor, site personnel should remove contaminated clothing once they are in a location of safety and leave it near the exclusion zone or in a safe place.
- The RM will conduct a head count to insure all personnel have been evacuated safely.
- In the event that emergency site evacuation is necessary, all personnel are to:
 1. Escape the emergency situation;
 2. Decontaminate to the maximum extent practical; and,
 3. Meet at the command post.

14.0 CONFINED SPACE

(NOT ANTICIPATED FOR THIS SITE)

A confined space is defined as a space or work area not designed or intended for normal human occupancy, having limited means of access and poor natural ventilation, and or any structure, including buildings or rooms which have limited means of egress. Examples include tanks, vats, and basements. Confined spaces identified at this site are listed below. If a confined space entry is conducted, it will be done in accordance with procedures presented in Attachment F.

<u>Type of Confined Space</u>	<u>Location On-Site</u>	<u>Comments</u>
-------------------------------	-------------------------	-----------------

Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

ATTACHMENT A

SITE SAFETY PLAN AMENDMENTS

Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

SITE SAFETY PLAN AMENDMENT	
Amendment No.:	
Site Name:	
Date of Issue:	
Type of Amendment:	
Reason for Amendment:	
Alternate Safeguard Procedures:	
Required Changes in PPE:	

USEPA On-Scene Coordinator

(Date)

SESCO Response Manager

(Date)

ER Site Health and Safety Officer

(Date)

Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

ATTACHMENT B

SITE MAPS

Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108



Trip to:

138 N Dixon Rd

Kokomo, IN 46901-4154

0.97 miles / 2 minutes

Notes

136 / 138 N Dixon Rd Kokomo, IN 46901
(765) 868-1089

St Joseph / St Vincent Hospital



1130 S Dixon Rd, Kokomo, IN 46902-6051



1. Start out going north on S Dixon Rd toward W County Road 00 NS. [Map](#)

0.9 Mi

0.9 Mi Total



2. S Dixon Rd becomes S Dixon St. [Map](#)

0.09 Mi

1.0 Mi Total



3. **138 N DIXON RD.** [Map](#)

Your destination is just past W Sycamore St

If you reach W Jefferson St you've gone about 0.1 miles too far

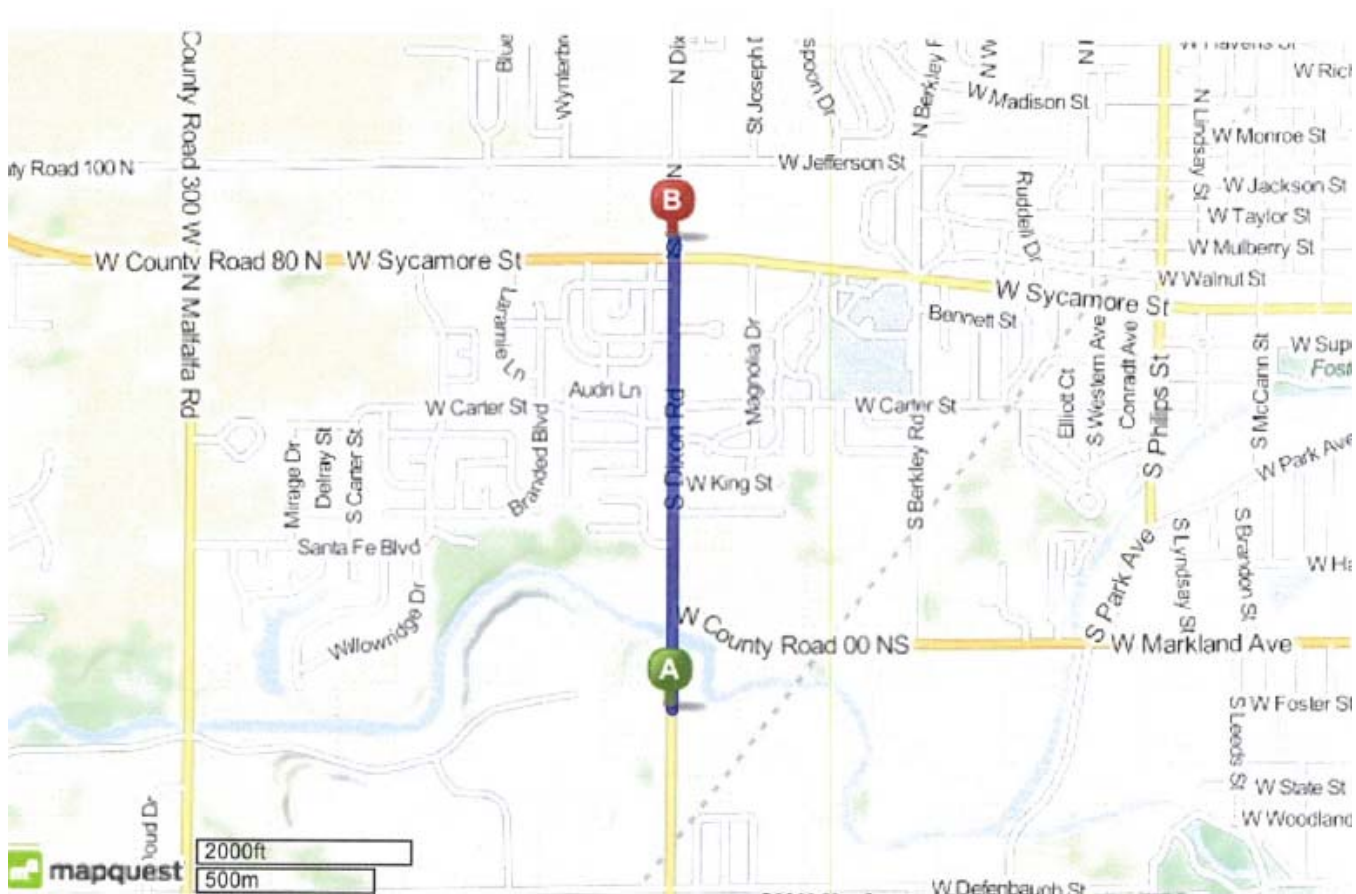


138 N Dixon Rd, Kokomo, IN 46901-4154

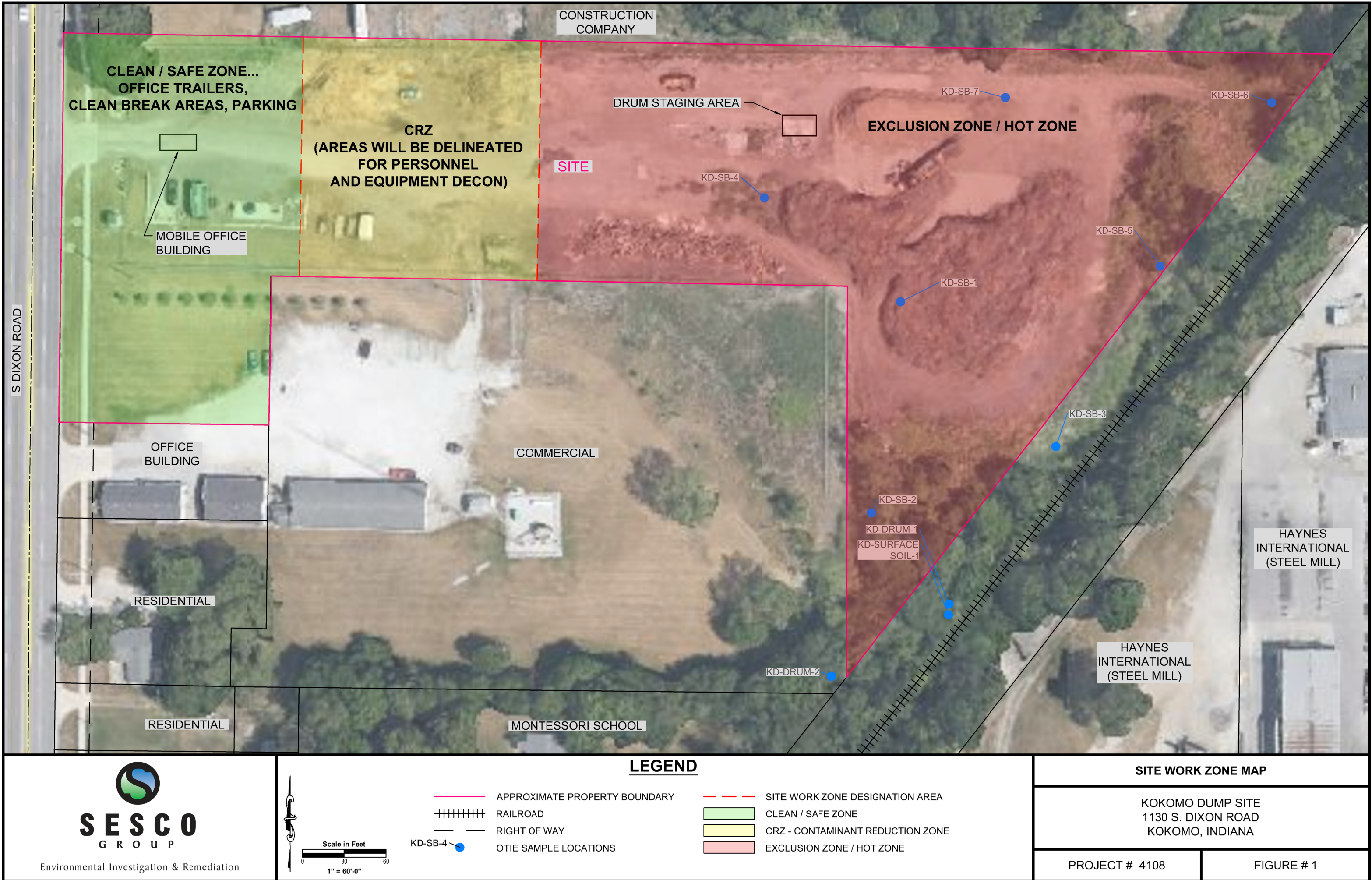
SESCO Group

1426 West 29th Street • Indianapolis, IN 46208
317-347-9590 • 888-872-1307 • F 317-347-9591 • www.sescogroup.com

SESCO Project #4108



O:\Consulting\@SESCO Technical Docs\#4108 Kokomo Dump Site\HASP\Figures\SITE WORK ZONE MAP.dwg, 10/25/2013 9:43:56 AM



Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

ATTACHMENT C

CHEMICAL HAZARD INFORMATION

Material Safety Data Sheet

Version 3.0
Revision Date 10/21/2009
Print Date 10/26/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Aroclor 1248 solution

Product Number : 47965-U
Brand : Supelco

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Distillates (petroleum), hydrotreated middle			
64742-46-7	265-148-2	649-221-00-X	99.995 %
Baseoil - unspecified			
64742-53-6	265-156-6	649-466-00-2	39.998 %
Aroclor 1248			
12672-29-6	-	-	0.005 %

3. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

No known OSHA hazards

HMIS Classification

Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes
Ingestion

May cause eye irritation.
May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point no data available

Ignition temperature no data available

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid inhalation of vapour or mist.
Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

For prolonged or repeated contact use protective gloves.

Eye protection

Safety glasses with side-shields conforming to EN166

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
------	--------

Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Materials to avoid

Strong oxidizing agents

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

12. ECOLOGICAL INFORMATION**Elimination information (persistence and degradability)**

no data available

Ecotoxicity effects

no data available

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS**Product**

Observe all federal, state, and local environmental regulations.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards

No known OSHA hazards

DSL Status

This product contains the following components that are not on the Canadian DSL nor NDSL lists.

Aroclor 1248

CAS-No.
12672-29-6

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

Baseoil - unspecified

CAS-No.	Revision Date
64742-53-6	1993-04-24

Pennsylvania Right To Know Components

Distillates (petroleum), hydrotreated middle
Baseoil - unspecified

CAS-No.	Revision Date
64742-46-7	
64742-53-6	1993-04-24

New Jersey Right To Know Components

Distillates (petroleum), hydrotreated middle
Baseoil - unspecified

CAS-No.	Revision Date
64742-46-7	
64742-53-6	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 10/22/2009
Print Date 10/26/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Aroclor 1254 solution

Product Number : 44814
Brand : Supelco

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
2,2,4-Trimethylpentane			
540-84-1	208-759-1	601-009-00-8	> 99.9 %
Aroclor 1254			
11097-69-1	-	-	< 0.01 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable liquid, Target Organ Effect, Irritant

Target Organs

Liver, Kidney

HMIS Classification

Health hazard: 2

Chronic Health Hazard: *

Flammability: 3

Physical hazards: 0

NFPA Rating

Health hazard: 2

Fire: 3

Reactivity Hazard: 0

Potential Health Effects

Inhalation

May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause

Skin
Eyes
Ingestion

drowsiness and dizziness.
May be harmful if absorbed through skin. Causes skin irritation.
Causes eye irritation.
Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point -12 °C (10 °F) - closed cup

Ignition temperature no data available

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Face shield and safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	liquid
------	--------

Safety data

pH	no data available
Melting point	-107 °C (-161 °F)
Boiling point	98 - 99 °C (208 - 210 °F) at 1,013 hPa (760 mmHg)
Flash point	-12 °C (10 °F) - closed cup
Ignition temperature	no data available
Lower explosion limit	1 %(V)
Upper explosion limit	6 %(V)
Vapour pressure	55 hPa (41 mmHg) at 21 °C (70 °F) 117 hPa (88 mmHg) at 37.8 °C (100.0 °F)
Density	0.690 g/cm ³
Water solubility	insoluble
Solubility	

10. STABILITY AND REACTIVITY**Storage stability**

Stable under recommended storage conditions.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous reactions

Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Target Organs	Liver, Kidney,

12. ECOLOGICAL INFORMATION**Elimination information (persistence and degradability)**

no data available

Ecotoxicity effects

no data available

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 1262 Class: 3 Packing group: II

Proper shipping name: Octanes

Reportable Quantity (RQ): 1000 lbs

Marine pollutant: No

Poison Inhalation Hazard: No

IMDG

UN-Number: 1262 Class: 3 Packing group: II EMS-No: F-E, S-E

Proper shipping name: OCTANES

Marine pollutant: No

IATA

UN-Number: 1262 Class: 3 Packing group: II

Proper shipping name: Octanes

15. REGULATORY INFORMATION

OSHA Hazards

Flammable liquid, Target Organ Effect, Irritant

DSL Status

This product contains the following components that are not on the Canadian DSL nor NDSL lists.

Aroclor 1254	CAS-No. 11097-69-1
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SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

2,2,4-Trimethylpentane	CAS-No. 540-84-1	Revision Date 2007-03-01
Aroclor 1254	11097-69-1	1993-04-24

Pennsylvania Right To Know Components

2,2,4-Trimethylpentane	CAS-No. 540-84-1	Revision Date 2007-03-01
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New Jersey Right To Know Components

CAS-No.	Revision Date
---------	---------------

2,2,4-Trimethylpentane

540-84-1

2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known in the State of California to cause cancer.
Aroclor 1254

CAS-No.
11097-69-1

Revision Date
1990-06-30

California Prop. 65 Components

WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.
Aroclor 1254

CAS-No.
11097-69-1

Revision Date
1990-06-30

16. OTHER INFORMATION

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 01/02/2009
Print Date 10/29/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Arsenic

Product Number : 11303
Brand : Riedel

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : As
Molecular Weight : 74.92 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Arsenic			
7440-38-2	231-148-6	033-001-00-X	-

3. HAZARDS IDENTIFICATION**Emergency Overview****OSHA Hazards**

Carcinogen, Target Organ Effect, Highly toxic by inhalation, Harmful by ingestion.

Target Organs

Skin, Lungs

HMIS Classification

Health Hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be fatal if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes
Ingestion

May cause eye irritation.
Harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point not applicable

Ignition temperature no data available

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Wear respiratory protection. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up

Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
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Arsenic	7440-38-2	TWA	0.01 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
		TWA	0.01 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
Remarks	Sec. 1910.1018 Inorganic arsenic.				
		TWA	0.01 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
	<p>Confirmed human carcinogen.</p> <p>Refers to Appendix A -- Carcinogens.</p> <p>Substance identified by other sources as a suspected or confirmed human carcinogen.</p> <p>Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL.</p> <p>Substances for which there is a Biological Exposure Index or Indices.</p>				

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	grey

Safety data

pH	no data available
Melting point	817 °C (1,503 °F)
Boiling point	no data available
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	5.727 g/cm ³
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Conditions to avoid

Heat. Exposure to air may affect product quality.

Materials to avoid

Oxidizing agents, Halogens, Palladium undergoes a violent reaction with arsenic, Zinc, Platinum oxide, Nitrogen trichloride, Bromine azide

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Arsenic oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 763 mg/kg

Remarks: Behavioral:Ataxia. Diarrhoea

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: Group 1 - Carcinogenic to humans Re-evaluation of arsenic, IARC Monograph (Vol. 84) (October 15, 2002) Some Drinking-water Disinfectants and Contaminants, including Arsenic (Arsenic)

NTP: NTP known to be carcinogenic (Arsenic)
OSHA: 1910.1018 (Arsenic)

Signs and Symptoms of Exposure

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

Potential Health Effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.
Target Organs	Skin, Lungs,

Additional Information

RTECS: CG0525000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 9.9 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 3.8 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 1558 Class: 6.1
Proper shipping name: Arsenic
Marine pollutant: No
Poison Inhalation Hazard: No

Packing group: II

IMDG

UN-Number: 1558 Class: 6.1
Proper shipping name: ARSENIC
Marine pollutant: No

Packing group: II

EMS-No: F-A, S-A

IATA

UN-Number: 1558 Class: 6.1
Proper shipping name: Arsenic

Packing group: II

15. REGULATORY INFORMATION**OSHA Hazards**

Carcinogen, Target Organ Effect, Highly toxic by inhalation, Harmful by ingestion.

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	1991-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	1991-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	1991-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	1991-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION**Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.



Health	2
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet

Barium AA Standard MSDS

Section 1: Chemical Product and Company Identification

Product Name: Barium AA Standard

Catalog Codes: SLB1582

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Barium; Nitric acid, 70%; Water

CI#: Not applicable.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Barium	7440-39-3	0.1
Water	7732-18-5	98.5
Nitric acid, fuming	7697-37-2	1.4

Toxicological Data on Ingredients: Barium LD50: Not available. LC50: Not available. Nitric acid, fuming LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death.

Potential Chronic Health Effects:

Hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Non-sensitizer for skin. **CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to lungs, mucous membranes.

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of reducing materials, of combustible materials, of organic materials.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as alkalis. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Barium TWA: 0.5 from ACGIH (TLV) [United States] Nitric acid, fuming TWA: 2 CEIL: 4 TWA: 5 CEIL: 10 Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Acidic.

Boiling Point: The lowest known value is 82.6 (180.7°F) (Nitric acid, fuming). Weighted average: 99.76°C (211.6°F)

Melting Point: May start to solidify at -41.6°C (-42.9°F) based on data for: Nitric acid, fuming.

Critical Temperature: Not available.

Specific Gravity: Weighted average: 1 (Water = 1)

Vapor Pressure: The highest known value is 6 kPa (@ 20°C) (Nitric acid, fuming). Weighted average: 2.35 kPa (@ 20°C)

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: The highest known value is 0.29 ppm (Nitric acid, fuming)

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances:

Highly reactive with alkalis. Slightly reactive to reactive with reducing agents, combustible materials, organic materials, metals, acids.

Corrosivity:

Highly corrosive in presence of aluminum, of zinc, of copper. Corrosive in presence of steel. Slightly corrosive in presence of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification:

: Corrosive liquid, acidic, inorganic, n.o.s (Nitric acid, solution; Barium Nitrate mixture) (Nitric acid, fuming) UNNA: UN3264 PG: II

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Nitric acid, 70% Massachusetts RTK: Nitric acid, 70% TSCA 8(b) inventory: Barium; Nitric acid, 70%; Water SARA 302/304/311/312 extremely hazardous substances: Nitric acid, 70% SARA 313 toxic chemical notification and release reporting: Nitric acid, 70% 2% CERCLA: Hazardous substances.: Nitric acid, 70%;

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

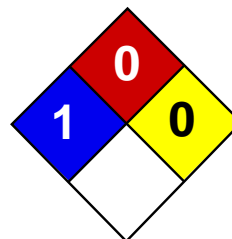
References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:17 PM

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Barium sulfate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Barium sulfate

Catalog Codes: SLB3148, SLB4648

CAS#: 7727-43-7

RTECS: CR0600000

TSCA: TSCA 8(b) inventory: Barium sulfate

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: BaSO₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Barium sulfate	7727-43-7	100

Toxicological Data on Ingredients: Barium sulfate LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions: No specific safety phrase has been found applicable for this product.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 10 from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 233.39 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Decomposes.

Melting Point: 1580°C (2876°F)

Critical Temperature: Not available.

Specific Gravity: 4.5 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Not available.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Causes damage to the following organs: lungs, mucous membranes.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Barium sulfate Massachusetts RTK: Barium sulfate TSCA 8(b) inventory: Barium sulfate

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

This product is not classified according to the EU regulations.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

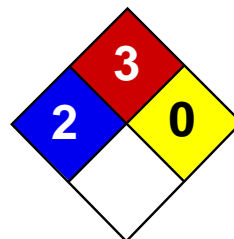
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C₆H₆

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

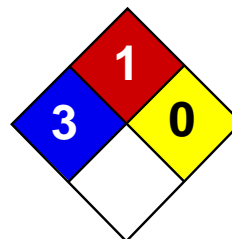
References: Not available.

Other Special Considerations: Not available.

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Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

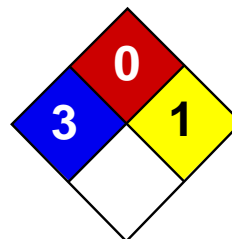
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:29 PM

Last Updated: 05/21/2013 12:00 PM

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Health	3
Fire	0
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Chromium Trioxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium Trioxide

Catalog Codes: SLC2068, SLC3859

CAS#: 1333-82-0

RTECS: GB6650000

TSCA: TSCA 8(b) inventory: Chromium Trioxide

CI#: Not available.

Synonym: Chromium (VI) Oxide; Chromic anhydride; Chromium (6+) Trioxide; Monochromium trioxide

Chemical Name: Chromium Trioxide

Chemical Formula: CrO₃

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium Trioxide	1333-82-0	100

Toxicological Data on Ingredients: Chromium Trioxide: ORAL (LD50): Acute: 80 mg/kg [Rat]. 127 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Slightly hazardous in case of skin contact (sensitizer). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant). CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of combustible materials of organic materials

Explosion Hazards in Presence of Various Substances:

Explosive in presence of open flames and sparks, of heat, of organic materials. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Arsenic reacts with Chromium trioxide with incandescence. A violent reaction or flaming is likely in the reaction of chromium oxide and aluminum powder. Benzene ignites on contact with chromium trioxide. Reacts with Sodium or Potassium with incandescence. A mixture of chromium trioxide, and sulfur ignites on warming. Ignites on contact with alcohols, acetic anhydride + tetrahydronaphthalene, acetone, butanol, chromium (II) sulfide, cyclohexanol, dimethyl formamide, ethanol, ethylene glycol, methanol, 2-propanol, pyridine. Contact with combustible or organic materials may cause fire.

Special Remarks on Explosion Hazards:

An explosion can occur when Chromium trioxide is mixed with potassium ferricyanide when dust is ignited by a spark. Chromium trioxide + potassium permanganate will explode. Can react explosively with acetic anhydride + heat, acetic acid + heat,, ethyl acetate, isoamyl alcohol, benzaldehyde, benzene, benzylthylaniline, butraldehyde, 1,3-dimethylhexahydropyrimidone, diethyl ether, ethyl acetate, isopropyl acetate, methyl dioxane, pelargonic acid, pentyl acetate, phosphorus + heat, propionaldehyde, and other organic materials or solvents.

Section 6: Accidental Release Measures**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Oxidizing material. Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from combustible material.. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as combustible materials, organic materials, metals, acids, alkalis.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Separate from acids, alkalies, reducing agents and combustibles. See NFPA 43A, Code for the Storage of Liquid and Solid Oxidizers.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg(Cr)/m) from ACGIH (TLV) [United States] Inhalation CEIL: 0.1 (mg(Cr)/m) from OSHA (PEL) [United States] Inhalation TWA: 0.001 (mg(Cr)/m) from NIOSH [United States] Inhalation Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Flakes solid. Powdered solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 99.99 g/mole

Color: Red. (Dark.)

pH (1% soln/water): 1.1 [Acidic.]

Boiling Point: Decomposes.

Melting Point: 197°C (386.6°F)

Critical Temperature: Not available.

Specific Gravity: Density: 2.7 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:

Easily soluble in cold water, hot water. Soluble in diethyl ether. Soluble in ethyl alcohol, nitric acid, acetic acid, acetone, and sulfuric acid. Solubility in water: 61.7 g/100 ml water @ 0 deg. C; 67.45 g/100 ml water @ 100 deg. C

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, dust generation, excess heat

Incompatibility with various substances: Reactive with combustible materials, organic materials, metals, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:

Hygroscopic. Incompatible with alcohol, spirit nitrous ether, almost every organic substance, bromides, chlorides, iodides, hypophosphites, sulfites, sulfides, methanol, furfuryl, ethylene glycol, glycerol, bromine pentafluoride, hydrogen sulfide, butanol, isobutanol, acetaldehyde, propionaldehyde, butylaldehyde, benzaldehyde, benzene, perlargonic acid, isopropyl acetate, pentyl acetate, methyldioxane, dimethyldioxane, acetone, benzylethylaniline, oils, greases or any easily oxidizable material. Acetylene is oxidized violently. Reacts violently with diethyl ether. It will react violently with naphthalene, camphor, glycerol, or turpentine. It will ignite ethy alcohol. Selenium reacts violently with Chromium Trioxide. Can react violently with most metal powders, ammonia, ammonium salts, phosphorus, sulfur, acids, finely divided organic compounds, flammable liquids.

Special Remarks on Corrosivity:

Corrosive because of oxidizing potency. Corrosive to some metals

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 80 mg/kg [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, gastrointestinal tract, upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans:

Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Slightly hazardous in case of skin contact (sensitizer).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose LDL [Rat] - Route: Skin; Dose: 55 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (effects on fertility: fetotoxicity or post-implantation mortality) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic). Epidemiological studies indicate long term exposure to dusts and mists at levels above the current PEL in chrome processing is associated with increases in respiratory tract cancer in man.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation and possible burns. Contact with broken skin may lead to formation of firmly marginated "chrome sores." May cause allergic contact dermatitis. Dermal absorption of large amounts may affect behavior and may result in kidney failure Eyes: Causes eye irritation. May cause severe damage including burns and blindness. Inhalation: Causes irritation of the respiratory tract. May cause severe burns of the nasal septum and respiratory tract, perforation of the nasal septum, congestion, and pulmonary edema. Ingestion: Causes gastrointestinal tract irritation with violent epigastric pain, nausea, vomiting and severe diarrhea. May cause tissue destruction resulting in hemorrhaging, circulatory collapse, unconsciousness and possible death. May affect respiration (cyanosis), blood (anemia, thrombocytopenia) May cause kidney failure and liver damage. **Chronic Potential Health Effects:** Skin: Repeated or prolonged skin contact may cause "chrome sores" on skin (especially broken skin). Eyes: Repeated or prolonged eye contact may cause conjunctivitis. Inhalation: Repeated or prolonged inhalation may cause chronic respiratory tract irritation with chronic rhinitis, hyperemia, chronic catarrh, congestion of the larynx, inflammation of the larynx, polyps of the upper respiratory tract, chronic inflammation of the lungs, emphysema, tracheitis, chronic bronchitis, chronic pharyngitis, bronchopneumonia, ulceration and perforation of the nasal septum. Ingestion: Repeated or prolonged ingestion may cause nausea, vomiting, loss of appetite, kidney damage, inflammation of the liver or even hepatitis with jaundice, leukocytosis, leukopenia, monocytosis, and eosinophilia

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification:

CLASS 5.1: Oxidizing material. Class 8: Corrosive material

Identification: : Chromium Trioxide, Anhydrous UNNA: 1463 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Chromium Trioxide California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Chromium Trioxide Connecticut hazardous material survey.: Chromium Trioxide Rhode Island RTK hazardous substances: Chromium Trioxide Pennsylvania RTK: Chromium Trioxide Massachusetts RTK: Chromium Trioxide Massachusetts spill list: Chromium Trioxide New Jersey: Chromium Trioxide New Jersey spill list: Chromium Trioxide TSCA 8(b) inventory: Chromium Trioxide TSCA 6 final risk management: Chromium Trioxide TSCA 8(a) IUR: Chromium Trioxide TSCA 12(b) annual export notification: Chromium Trioxide

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

CLASS C: Oxidizing material. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive solid.

DSCL (EEC):

R8- Contact with combustible material may cause fire. R25- Toxic if swallowed. R35- Causes severe burns. R43- May cause sensitization by skin contact. R49- May cause cancer by inhalation. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S53- Avoid exposure - obtain special instructions before use. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:55 PM

Last Updated: 11/01/2010 12:00 PM

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=====MSDS=====

Safety Information

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[TOP](#)

FSC: 6850MSDS Date: 03/18/1991MSDS Num: BVTJQ

Submitter: F BT LIIN: 00F037221 Tech Review: 11/02/1994 Status CD: C

Product ID: 000000001 LEAD MFN: 01

Article: N Kit Part: N

Responsible Party Cage: 1D306
Name: AT AND T TECHNOLOGIES GENERAL HQ

Address: 1 OAK WAY Box: N/K
City: BERKELEY HEIGHTS State: NJ Zip: 07922-2727

Country: US
Info Phone Number: 201-771-2000/908-204-8243
Emergency Phone Number: 201-771-2000/908-204-8243

Preparer's Name: N/P

Proprietary Ind: N Review Ind: Y
Published: Y Special Project CD: N

=====Preparer=====

Co. when other than Responsible Party Co.

=====

[TOP](#)

Cage: 1D306 Assigned Ind: N

Name: AT AND T TECHNOLOGIES GENERAL HQ
Address: 1 OAK WAY Box:
City: BERKELEY HEIGHTS State: NJ Zip: 07922-2727

=====Contractor=====

Summary

=====

[TOP](#)

Cage:1D306 Name:AT AND T TECHNOLOGIES GENERAL HQ
Address:] OAK WAY
City:BERKELEY HEIGHTS State:NJ Zip:07922-2727
Country:US Phone:201-771-2000/908-204-8243

=====Ingredients=====

Ingredients

=====

[TOP](#)

Cas: 7439-92-1 Code: M RTECS #: OF7525000 Code: M

Name: LEAD, INORGANIC LEAD (IARC GROUP 2B) *94-3*

% Text: >99 Environmental Wt:
Other REC Limits: N/K

OSHA PEL: 50 UG/CUM Code: M OSHA STEL: Code:
ACGIH TLV: 0.15 MG/CUM Code: M N/P Code:

EPA Rpt Qty: 1 LB

ACGIH
STEL:
DOT Rpt 1 LB
Qty:

Ozone Depleting Chemical: N

Hazards Data

Health

[TOP](#)

LD50 LC50 Mixture N/P

Route Of Entry Inds – Inhalation: YES

Skin: YES

Ingestion: NO

Carcinogenicity Inds – NTP: NO

IARC: YES

OSHA: NO

Health Hazards Acute And Chronic

EARLY SYMPTOMS OF LEAD INTOXICATION INCLUDE PERSISTENT METALLIC TASTE, ANOREXIA, CONSTIPATION & SEVERE ABDOMINAL PAIN. CONTINUED EXPOSURES RESULT IN MUSCLE WEAKNESS & FATIGUE, DEGENERATIVE CHANGES IN MOTOR NEURONS, PALLOR OF FACE, ANEMIA, LIVER & KIDNEY DAMAGE, HEADACHE & INSOMNIA. CAUSES CHROMOSOMAL ABBERATIONS.

Explanation Of Carcinogenicity

SEE INGREDIENTS.

Signs And Symptions Of Overexposure

EARLY SYMPTOMS OF LEAD INTOXICATION INCLUDE PERSISTENT METALLIC TASTE, ANOREXIA, CONSTIPATION & SEVERE ABDOMINAL PAIN. CONTINUED EXPOSURES RESULT IN MUSCLE WEAKNESS & FATIGUE, DEGENERATIVE CHANGES IN MOTOR NEURONS, PALLOR OF FACE, ANEMIA, LIVER & KIDNEY DAMAGE, HEADACHE & INSOMNIA. CAUSES CHROMOSOMAL ABBERATIONS.

Medical Cond Aggravated By Exposure

N/K

First Aid

FLUSH W/LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINS. SKIN: WASH W/SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. INGESTION: IF CONSCIOUS GIVE LARGE AMOUNTS OF WATER & INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Spill Release Procedures

IF MATERIAL IS RECLAIMED (GROUND/CHOPPED), CLEAN-UP SHOULD BE PERFORMED AS SOON AS POSSIBLE TO MINIMIZE DISPERSION. IF POSSIBLE, VACUUM EQUIPPED W/HEPA FILTER SHOULD BE USED. IF NOT, USE WET METHODS.

Neutralizing Agent

N/K

Waste Disposal Methods

DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE & LOCAL REGULATIONS. LEAD MUST BE DISPOSED OF IN COMPLIANCE W/RCRA. RECLAMATION OF LEAD AT AN APPROPRIATE FACILITY IS SUGGESTED.

Handling And Storage Precautions

DON'T EAT, DRINK, SMOKE/APPLY COSMETICS IN ANY WORK AREA WHERE EXPOSURE TO LEAD, LEAD DUST/LEAD FUME MAY OCCUR.

Other Precautions

ANNUAL PHYSICAL EXAMINATIONS ARE REQUIRED WHEN AIRBORNE LEAD LEVELS EXCEED 30 UG/CUM FOR 30 DAYS.

Explosion Hazard Information

Fire and

[TOP](#)

Flash Point Method: N/P

Flash Point:

Flash Point Text: NONE

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/R

Upper Limits: N/R

Extinguishing Media

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE CONDITIONS.

Fire Fighting Procedures

USE SCBA & PROTECTIVE CLOTHING.

Unusual Fire/Explosion Hazard

N/K

Measures [Control](#) [TOP](#)

Respiratory Protection

REQUIRED IF CONCENTRATION EXCEEDS PEL. FOR CONCENTRATIONS 50–500 UG/CUM, USE HIGH EFFICIENCY TOXIC DUST RESPIRATOR CARTRIDGE.

Ventilation

GENERAL MAY BE ADEQUATE. LOCAL EXHAUST IS PREFERRED. SHOULD BE IN PATTERN/VOLUME SUFFICIENT TO MAINTAIN EXPOSURE LEVELS.

Protective Gloves

REQUIRED. COTTON TYPE SUGGESTED.

Eye Protection

SAFETY GLASSES W/SIDE SHIELDS

Other Protective Equipment

SHOE COVERS, COVERALLS, HEAD PROTECTION, GOGGLES

Work Hygienic Practices

CLOTHES MUST BE CLEANED & DRIED WEEKLY. WASH AFTER EXPOSURE/HANDLING & BEFORE EATING/DRINKING/SMOKING/APPLYING MAKE-UP.

Supplemental Safety and Health

N/K

Physical/Chemical Properties

[TOP](#)

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point:

B.P. Text: 3164F

Melt/Freeze Pt:

M.P/F.P Text: 621.32F

Decomp Temp:

Decomp Text: N/K

Vapor Pres: 1

Vapor Density: N/R

Volatile Org Content %:

Spec Gravity: 11.3

VOC Pounds/Gallon:

PH: N/R

VOC Grams/Liter:

Viscosity: N/P

Evaporation Rate & Reference: N/R

Solubility in Water: INSOLUBLE

Appearance and Odor: HEAVY, DUCTILE SOFT GRAY SOLID

Percent Volatiles by Volume: 0

Corrosion Rate: N/K

=====
Data ===== Reactivity

[TOP](#)

Stability Indicator: YES

Stability Condition To Avoid: HIGH TEMPS

Materials To Avoid: STRONG OXIDIZERS, HYDROGEN PEROXIDE, ACTIVE METALS

Hazardous Decomposition Products: TOXIC FUMES OF LEAD

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization NONE

:

=====
Toxicological Information

[TOP](#)

Toxicological Information:N/P

=====
Ecological Information

=====
Ecological

[TOP](#)

Ecological: N/P

=====
Transport Information

=====
MSDS

[TOP](#)

Transport Information:N/P

=====
Regulatory Information

=====
Regulatory

[TOP](#)

Sara Title III Information: N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

=====
Other Information

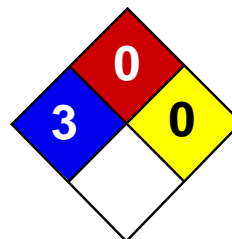
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Other

[TOP](#)

Other Information: N/P

=====

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Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet

Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m³) from OSHA (PEL) [United States]
Inhalation TWA: 0.025 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

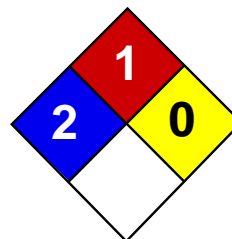
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Selenium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Selenium

Catalog Codes: SLS2629

CAS#: 7782-49-2

RTECS: VS7700000

TSCA: TSCA 8(b) inventory: Selenium

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Se

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Selenium	7782-49-2	100

Toxicological Data on Ingredients: Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.2 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 78.96 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 684.9°C (1264.8°F)

Melting Point: 217°C (422.6°F)

Critical Temperature: Not available.

Specific Gravity: 4.81 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6700 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Selenium powder : UN2658 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

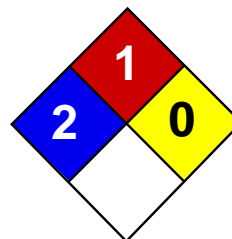
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (mg/m³) from OSHA (PEL) TWA: 0.01 (mg/m³) from OSHA NIOSH Australia: TWA: 0.1 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2212°C (4013.6°F)

Melting Point: 961°C (1761.8°F)

Critical Temperature: Not available.

Specific Gravity: 10.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:26 PM

Last Updated: 05/21/2013 12:00 PM

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MSDS

Safety Information

TOP

FSC:

MSDS Date:

MSDS Num:

6850

02/24/1995

CBYLC

Submitter:

LIIN:

Tech Review:

Status CD:

N EN

00N072525

08/29/1996

C

Product ID:

MFN:

2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN SOLUTION,
M-613

01

Article:

Kit Part:

N

N

Cage:

Responsible Party

0U4A8

Name:

ACCUSTANDARD INC

Address:

25 SCIENCE PARK SUITE 687

City:

State:

Zip:

NEW HAVEN

CT

06511

Country:

US

Info Phone Number:

203-786-5290

Emergency Phone Number:

203-786-5290

Radioactive Ind:

N

Preparer's Name:

N/P

Proprietary Ind:

N

Review Ind:

N

Published:

Y

Special Project CD:

N

Contractor

Summary

TOP

Cage:

Name:

0U4A8

ACCUSTANDARD INC

Address:

125 MARKET ST

City:

State:

Zip:

NEW HAVEN

CT

06513

Country:

US

Phone:

800-442-5290

Ingredients

TOP

Cas: 1746-01-6

M

HP3500000

M

Code:

RTECS #:

Code:

Name: DIBENZO-P-DIOXIN, 2,3,7,8-TETRACHLORO-; (2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN) (TCDD)
(CERCLA)

% Text: 0.001

Environmental Wt:

Other REC Limits: N/K

OSHA PEL:

N/K (FP N)

Code: M OSHA
STEL:

Code:

ACGIH TLV: N/K (FP N)

Code: M ACGIH N/P
STEL:

Code:

EPA Rpt Qty:

DOT
Rpt
Qty:

Ozone Depleting Chemical:

Cas: 108-88-3

M

XS5250000

M

Code:

RTECS #:

Code:

Name: TOLUENE (SARA 313) (CERCLA)

% Text: 99.999

Environmental Wt:

Other REC Limits: N/K

OSHA PEL:

200 PPM

Code: M OSHA
STEL:

Code:

ACGIH TLV: 50 PPM, S

Code: M ACGIH N/P
STEL:

Code:

EPA Rpt Qty: 1000 LBS

DOT 1000 LBS
Rpt
Qty:

Ozone Depleting Chemical:

N

Hazards Data

Health

[TOP](#)

LD50 LC50 Mixture

NONE SPECIFIED BY MANUFACTURER.

Route Of Entry Inds – Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Inds – NTP: NO

IARC: NO

OSHA: NO

Health Hazards Acute And Chronic

ACUTE: HARMFUL/FATAL IF SWALLOWED. VAP HARMFUL IF INHALED. SYMPS: HDCH, DIZZ, HALLUCINATIONS, DISTORTED PERCEPTIONS, CHANGES IN MOTOR ACTIVITY, NAUS, RESP IRRIT, CNS DEPRESS, UNCON, LIVER, KIDNEY & LU NG DMG. CONT MAY CAUSE SEV EYE IRRIT. MAY CAUSE SKIN IRRIT. CHRONIC: TOLUENE APPEARS ON THE NAVY (EFTS OF OVEREXPOSURE)

Explanation Of Carcinogenicity

NOT RELEVANT.

Signs And Symptions Of Overexposure

HLTH HAZ: OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST. SEEK CONSULTATION FROM APPROPRIATE HEALTH PROFESSIONALS CONCERNING LATEST HAZARD LIST INFORMATION AND SAFE HANDLING AND EXPOSURE INFORMATION (FP N).

Medical Cond Aggravated By Exposure

RESPIRATORY, LIVER AND KIDNEY CONDITIONS.

First Aid

GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE. EYES: IMMEDIATELY FLUSH THOROUGHLY W/WATER FOR AT LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH THOROUGHLY W/LARGE AMOUNTS OF WATER. INHAL: REMOVE TO FRESH AIR; GIVE ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. INGEST: CALL MD IMMEDIATELY. ONLY INDUCE VOMITING AT THE INSTRUCTIONS OF MD. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Spill Release Procedures

WEAR SUITABLE PROTECTIVE EQUIPMENT. ELIMINATE ANY IGNITION SORUCES UNTIL THE AREA IS DETERMINED TO BE FREE FROM EXPLOSION OR FIRE HAZARDS. CONTAIN THE RELEASE AND ELIMINATE ITS SOURCE, IF THIS CAN BE DONE WITHOUT RISK.

Neutralizing Agent

NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods

DISPOSE AS HAZARDOUS WASTE. COMPLY WITH FEDERAL, STATE AND LOCAL REGULATIONS.

Handling And Storage Precautions

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL AREA AWAY FROM IGNITION SOURCES AND OXIDIZERS. DO NOT BREATHE VAPOR OR MIST.

Other Precautions

DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. ELECTRICALLY GROUND ALL EQUIPMENT WHEN HANDLING THIS PRODUCT.

===== Fire and

Explosion Hazard Information

=====

[TOP](#)

Flash Point Method:

TCC

Flash Point:

Flash Point Text: 40.0F,4.4C

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: 1.30%

Upper Limits: 7.10%

Extinguishing Media

USE DRY CHEMICAL, FOAM, CARBON DIOXIDE. WATER SPRAY TO COOL EXPOSED CONTAINERS.

Fire Fighting Procedures

WEAR NIOSH APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard

DANGEROUS FIRE AND EXPLOSION HAZARD. VAPOR CAN TRAVEL DISTANCES TO IGNITION SOURCES AND FLASH BACK.

===== Control

Measures =====

[TOP](#)

Respiratory Protection

IF WORKPLACE EXPOS LIM OF PROD/ANY COMPONENT IS EXCEEDED (SEE TLV/PEL), A NIOSH APPRVD AIR SUPPLIED RESP IS ADVISED IN ABSENCE OF PROPER ENVIRON CTL. OSHA REGS ALSO PERMIT OTHER NIOSH APPRVD RESPS (NE G PRESS TYPE) UNDER SPECIFIED (SUP DAT)

Ventilation

MATERIAL SHOULD BE HANDLED OR TRANSFERRED IN AN APPROVED FUME HOOD OR WITH ADEQUATE VENTILATION.

Protective Gloves

VITON OR EQUIVALENT.

Eye Protection

ANSI APPRVD CHEM WORKERS GOGGS (FP N).

Other Protective Equipment

EMERGENCY EYEWASH DELUGE SHOWER MEETING ANSI DESIGN CRITERIA (FP N).

Work Hygienic Practices

WASH THOROUGHLY AFTER HANDLING. DO NOT TAKE INTERNALLY.

Supplemental Safety and Health

RESP PROT: CNDTNS (SEE YOUR SFTY EQUIP SUPPLIER). ENGINEERING AND/OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOS.

Physical/Chemical Properties

[TOP](#)

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point:

B.P. Text: 232F,111C

Melt/Freeze Pt:

M.P/F.P Text: -139F,-95C

Decomp Temp:

Decomp Text: N/K

Vapor Pres: 21.9 @ 20C

Vapor Density: 3.2

Volatile Org Content %:
VOC Pounds/Gallon:

Spec Gravity: 0.87 (H*2O=1)

PH: N/K

VOC Grams/Liter:

Viscosity: N/P

Evaporation Rate & Reference: 2.2 (BUTYL ACETATE=1)

Solubility in Water: INSOLUBLE

Appearance and Odor: CLEAR LIQUID, WITH AROMATIC ODOR

Percent Volatiles by Volume: >99

Corrosion Rate: N/K

Reactivity Data

[TOP](#)

Stability Indicator:

YES

Stability Condition To Avoid: HEAT; CONTACT WITH IGNITION SOURCES.

Materials To Avoid: OXIDIZERS, STRONG MINERAL ACIDS.

Hazardous Decomposition Products: CO*X, HYDROCARBONS.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization NOT RELEVANT.

:

===== Toxicological Information =====

[TOP](#)

Toxicological Information:

N/P

===== Ecological Information =====

[TOP](#)

Ecological:

N/P

===== MSDS Transport Information =====

[TOP](#)

Transport Information:

N/P

===== Regulatory Information =====

[TOP](#)

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

===== Other Information =====

[TOP](#)

Other Information:

N/P

===== HMIS HAZCOM Label =====

[TOP](#)

[Print Labels](#)

Product ID:

2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN SOLUTION, M-613

Cage: 0U4A8

Assigned IND: N

Company Name:

ACCUSTANDARD INC

Street: 125 MARKET ST

PO Box:

City:

NEW HAVEN

State: CT

Zipcode: 06513

Country: US

Health Emergency Phone:

203-786-5290

Label Required IND:

Y

Date Of Label Review: 08/29/1996

Status Code: C

MFG Label NO:

Label Date: 08/29/1996

Year Procured:

Origination Code:

G

Chronic Hazard IND: Y

Eye Protection IND: YES

Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection YES
IND:

Health Hazard:

Moderate

Contact Hazard: Moderate

Fire Hazard:

Severe

Reactivity Hazard: None

Hazard And Precautions

FLAMMABLE. ACUTE: HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL IF INHALED. SYMPTOMS: HEADACHE, DIZZINESS, HALLUCINATIONS, DISTORTED PERCEPTIONS, CHANGES IN MOTOR ACTIVITY, NAUSEA, RESPIRATORY IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, UNCONSCIOUSNESS, LIVER, KIDNEY AND LUNG DAMAGE. CONTACT MAY CAUSE SEVERE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CHRONIC: TOLUENE APPEARS ON THE NAVY OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST (FP N).

=====

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Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

ATTACHMENT D

INTEGRATED AIR SAMPLING

SESCO Group

1426 West 29th Street • Indianapolis, IN 46208
317-347-9590 • 888-872-1307 • F 317-347-9591 • www.sescogroup.com

Methods of Personal Air Sampling

ER will perform air sampling for lead and arsenic in the worker's breathing zone using NIOSH Method 7300 (or equivalent for metals). PEM samples for metals will be analyzed by Microbac in Merrillville, Indiana or applicable AIHA accredited laboratory.

Sampling Locations

Homogeneous exposure groups (HEGs) will be identified as part of this excavation and materials-handling phase of the project. Establishing HEGs is a recognized exposure assessment method for personnel performing similar activities where exposure potential would be predicted to be the same or reasonably equivalent. ER will identify personnel in each HEG to wear the personal monitoring devices.

Frequency of Sampling

In general, dust samples will be obtained once the initial intrusive activity commences and will continue for a minimum of three (3) consecutive days in order to characterize potential worker exposures. Periodic monitoring will be conducted when work begins on a different portion of the Site, if a different type of operation is being initiated, or if employees are working with materials known to contain lead and arsenic at locations where monitoring was not performed previously. Air sampling will be performed for the duration of field activities conducted in hazardous areas of the site or after analyzing the sample data ER's or the Site's health and safety officer determines that air sampling is not required.

Record Keeping

All records will be compiled and maintained by ER for the project duration.

Records will include the following:

1. Pre-calibration (before personal air sampling begins)
2. Post-calibration (after personal air sampling has been completed)
3. Field observations
4. Calculations and chain-of-custody forms
5. Metals analytical results
6. Daily monitoring will be recorded in the log book
7. Downloaded electronic data from air monitor equipment. (if sampling pumps are equipped)

Minimum Field Data Requirements

The following lists the minimum data that are to be collected for sampling:

Air pump/monitor data

Pump or instrument ID

Final flow meter setting

Final flow rate (L/min)

Average flow rate (L/min)

Initial flow rate (L/min)

Calibration date

Calibrator type

Initial flow meter setting

SESCO Group

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Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

Sample media information (filter cassettes)

Field sample ID	Media type
Lab ID #	Type sample

Sampling information

Start date	Sample time
Start time	Sample volume (L)
End date	Sample volume (m3)
End time	Analysis
Sample time	

Task description (for personal monitoring)

Employee name/area description	Job task
Employer	Activity

Results

Total mass (µg) (arsenic/lead lab results	Lab comments
---	--------------

Lab result only)

The air-monitoring program at the Kokomo Site consists of a combination of work zone, personnel (worker) monitoring for particulates (dust), and air sampling for metals.

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Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

ATTACHMENT E
SITE SPECIFIC TRAINING RECORD

Health and Safety Plan
Kokomo Dump Site
1130 S. Dixon Road, Kokomo, IN 46901
U.S. EPA Site Spill ID #C564
SESCO Project #4108

SITE-SPECIFIC TRAINING RECORD

This is to advise that _____ conducted a Site-Specific Training
(Instructor's name)

course for _____ at the
(Company Name)

_____ project on _____.
(TO #, Project Name) (Date)

The total duration of the instructions was _____ hours.

Instruction covered the topics checked off below:

- Site Location, Description and History ☐
- Potential site hazards (chemical, physical, and biological) ☐
- Chemical, physical, and toxicological properties of site contaminants ☐
- Safe work practices ☐
- Training requirements ☐
- Medical Surveillance ☐
- Control Zones ☐
- Monitoring ☐
- Selection, use, and limitation, of personal protective equipment ☐
- Personnel and equipment decontamination ☐
- Emergency response procedures ☐
- Hazard communication ☐
- Blood borne pathogen briefing ☐

The following participant attended the training course for the full duration indicated above.

Name (Print)

Signature